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TRANSACTIONS

OF THE

BOMBAY GEOGRAPHICAL SOCIETY.

FROM JULY 1852 TO DECEMBER 1853.

EDITED BY THE SECRETARY.

VOLUME XI.

BOMBAY:
PRINTED AT THE "TIMES" PRESS,
BY T. W. WRAY.

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PROCEEDINGS

OF THE

BOMBAY GEOGRAPHICAL SOCIETY.

THE Annual General Meeting of the Bombay Geographical Society was held in their Rooms, Town Hall, on Thursday the 17th May 1853,—Present—W E Frere, Esq., in the Chair ; Thomas L. Jenkins, Esq. ; Venayekrow Jagonnathjee, Esq. ; Narayen Dajee, Esq. ; Commander Griffith Jenkins, I. N.; and Dr. Buist, Secretary.

The minutes of last year's meeting having been read:—

REPORT.

The Secretary stated that according to custom, he would now proceed to lay a short account of the proceedings of the Society during the year before the Meeting. The past twelve months had not been a very active one, and an account of what had occurred would not occupy any great amount of their time. Three members (the late lamented Professor Patton, Captain J. Willoughby, and Manakjee Limjee, Esquire,) were removed by death, and two, Colonel Moore and Mr. Dickinson, have permanently returned to Europe; on the other hand six new members had been elected, and one had returned from Europe, restoring the balance of resident members to two.

The publication of the 10th volume of the Society's Transactions, containing seven valuable contributions, had been completed in August, and copies distributed to members and other learned and scientific bodies.

The large supply of instruments referred to in my last year's report had but just arrived, and will, it is hoped, be disposed of before the setting in of the monsoon.

The large collection of Red Sea Survey papers on being resubmitted for the consideration of the Committee on Publication were committed to my hands for abridgement. They have accordingly been curtailed, and will appear in the ensuing volume of our Transactions.

The following papers had been received in the course of the season, the first of these had already appeared in the tenth volume, the remaining three had all passed through the press for next number of the Transactions:—

1.—Paper on the Laterite of the Southern Maratha Country. By Captain G. Wingate, Engineers, Bombay Army. Presented by the author.

2.—Report on the Navigation of the River Taptee. By T. J. Edwards, Esquire. Presented by Government.

3.—Geology of the Belgaum Collectorate. By Lieutenant A. Aytoun, Bombay Artillery. Two parts. Presented by Government.

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4.—On the self-acting Hygrometer. By Dr. C. G. E. Ford, Madras Army. Presented by the author.

On examining the voting lists the following were declared the Office-bearers for the ensuing year :—

VICE-PRESIDENTS.

Lieut. Col. J. Holland.	Honble D. A. Blane, Esq.
John McLennan, Esq., M. D.	

RESIDENT-MEMBERS.

J. G. Lumsden, Esq.	N. Oliver, Esq.
Commander G. Jenkins, I. N.	J. Smith, Esq.
John Ritchie, Esq.	Commander Barker, I. N.
W. Howard, Esq.	Captain Kempthorne, I. N.
A. Malet, Esq.	Jagonnathjee Sunkersett, Esq.
Charles Morehead, Esq., M. D.	Cursetjee Jamsetjee, Esq.

NON-RESIDENT MEMBERS.

Colonel Rawlinson.	Captain R. Ethersey, I. N.
Major LeGrand Jacob.	Major John Jacob.
Major G. Fulljames.	Dr. E. Impey.
Lieut. C. J. Cruttenden, I. N.	Colonel O. Felix.

The Committee on Publication and Finance were continued; Jagonnathjee Sunkersett, Esquire, and Cursetjee Jamsetjee, Esquire, having been elected in room of Mr. Dickinson and Dr. Haines.

The accounts for the past year were made up, exhibiting a balance of Rupees one thousand and forty in favor of the Society on the 1st instant. They were referred to the Committee on Accounts for audit.

The Meeting then adjourned.

PRESENTS TO THE LIBRARY.

From June 1852 *to December* 1853.

Observations made at the Magnetical and Meteorological Observatory at Hobartown, in Van Diemen's Land, vols. 2nd and 3rd. By Lieutenant-Colonel Sabine. Presented by H. M.'s Government.

Journal of the Indian Archipelago and Eastern Asia, from March to October, 1852. Presented by Government.

Annual Report of the Grant Medical College, Bombay, for the Sessions 1851-52 and 1852-53. Presented by the Principal of the College.

Introductory Lecture delivered in the Grant Medical College. By W. C. Coles, Esq., M. D. Presented by ditto.

Journal of the Royal Asiatic Society of Great Britain and Ireland, vol. 13th, 2 parts, and vol. 15th part 1. Presented by the Society.

Memoir on the Babylonian and Assyrian Inscriptions. By Lieutenant-Colonel H. C. Rawlinson, C. B. Journal of the Royal Asiatic Society, vol. xiv., part i. Presented by Society.

Bulletin De La Societe De Geographie. Quartrieme Serie, Tome i. ii. iii. Presented by the Geographical Society at Paris.

Maury's Sailing Directions, third and fourth editions, improved and enlarged. Presented by the author.

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Meteorological Observations made at the Meteorological Bungalow on Dodabetta, in 1848-50, under the direction of the late T. G. Taylor, F. R. S. and F. R. A. S., and of W. S. Jacob, F. R. A. S. Presented by the Madras Government.

Rapport sur les races nègres de l' Afrique Orientale au sud de l' èquateur, observèes par M. D. Froberville.

Abstract of Meteorological Observations made at Futtegurh for the year 1850, North West Provinces, Bengal. By J. C. Pyle, Esq. Presented by Colonel Sykes.

Rules and Regulations and List of Members of the East India United Service Club. Presented by the Secretary.

Journal of the Royal Geographical Society of London, vols. 21st and 22nd Presented by the Society.

Proceedings of a Committee of the Obstetric Institution, held on Tuesday the 22nd June 1852. Presented by Dr. Morehead.

Journal Asiatique ou Recuil De Mèmories, iv. serie, Tomas xvi., xvii., xviii.

Notes upon Russia; being a translation of the earliest account of that country. By the Baron Sigismund Von Herbestein. Hakluyt Society.

Sociètè Royale Des Antiquaires Du Nord, Copenhagen, Rapport Des Sources Annuelles de 1848-51. Presented by the Society.

Geology of the Island of Bombay, with a Map and Plates. By Henry J. Carter Esq., Assistant Surgeon, Bombay Establishment. Presented by the author.

The Journal of the Bombay Branch of the Royal Asiatic Society, Nos. 16, 17, and 18. Presented by the Society.

The Lands of the Bible, in two vols. By Rev. J. Wilson, D. D. Presented by the author.

The Parsi Religion as contained in the Zend Avasta. By Rev. J. Wilson, D. D. Presented by ditto.

Sermon to the Parsis, with a historical notice of their arrival in India. By Rev. J. Wilson, D. D. Presented by ditto.

The Evangelization of India, containing an account of the Aboriginal Tribes of Western India, &c. By Rev. J. Wilson, D. D. Presented by ditto.

Second Exposure of Hinduism. By Rev. J. Wilson, D. D. Presented by ditto.

Idiomatical Exercises in English and Marathee. By Rev. J. Wilson, D. D. Presented by ditto.

A Memoir of Mrs. Margaret Wilson. By Rev. J. Wilson, D. D. Presented by ditto.

The Bombay Engineer's Report for the official years 1850-51 and 1851-52. Presented by Government.

The 29th Annual Report of the Royal Asiatic Society of Great Britain and Ireland for 1852. Presented by the Society.

Address at the Anniversary Meeting of the Royal Geographical Society, held on 24th May 1852. By Sir Roderick Impey Murchison. Presented by the Society.

Catalogue of the Library of the Royal Geographical Society, corrected to May 1851. Presented by the Society.

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Abhandlungen der Mathemath, Physikal Classe der Koeniglich Bayerischen Akademie der Wessenschaften. 2 vols. Presented by the Society at Munich.

Deaths in Bombay during 1851 and 1852. By Dr. A. H. Leith. Presented by the Medical Board.

Report of the Bombay Chamber of Commerce for the years 1851-52 and 1852-53. Presented by the Chamber.

Index to Books and Papers on the Physical Geography, Antiquities, and Statistics of India. By George Buist, L. L. D. Presented by the author.

Nacâo Originaria da India. Presented by Signior Mariano Mont Aligre.

List of Members, Officers &c. of the Royal Institution of Great Britain and Ireland, with the Report of the Visitors for the year 1851. Presented by the Royal Institution.

Notices of the Meetings of the Members of the Royal Institution of Great Britain and Ireland. Presented by the Royal Institution.

Transactions of the Medical and Physical Society of Bombay, No. 1, New Series. Presented by the Secretary, and one presented by the Medical Board.

A brief account of the Silk Manufacture of the Punjaub. By H. Cope, Esquire, Secretary to the Agri-Horticultural Society of the Punjab. Presented by the Society.

Bulletin der Koongal Akadamie der Wissenschaften. Presented by the Society.

Transactions of the Meteorological Society of Mauritius, for 1852. Presented by the Society.

Smithsonian Contributions to Knowledge, vols. 3rd, 4th, and 5th. Presented by the Smithsonian Institution, Washington.

Fifth and Sixth Annual Report of the Board of Regents of the Smithsonian Institution 1851. Presented by ditto.

Smithsonian Report on recent improvements in the Chemical Arts. By Booth and Morfitt. Quarto. Presented by ditto.

Register of Periodical Phenomena and List of Works published by the Smithsonian Institution. Presented by ditto.

Abstract of the 7th Census of the United States. Presented by the Commissioner.

A Geological Report on the Kymaoon Mountains, the Ramghur Coal Fields, and the manufacture of Iron. By D. H. Williams, Esquire. Presented by Government.

Bombay Magnetical and Meteorological Observations for 1850, made under the superintendence of Commander Montriou, I. N. Presented by Government.

An introductory Lecture delivered in the Grant Medical College at Bombay on the 15th June 1853. By C. Morehead, M. D., Principal of the College. Presented by ditto.

History, Condition and Prospects of the Indian Tribes of the United States. By H. R. Schoolcraft, L. L. D. Illustrated by S. Eastman, U. S. A., Parts 2nd and 3rd. Presented by the Hon'ble the Commissioner of the United States.

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A series of Charts with sailing directions, embracing surveys of the State of California. By Cadwalader Ringgold, Commander U. S. Navy. Presented by the National Observatory, Washington.

Norton's Literary Register and Book Buyer's Almanack for 1853. Presented by ditto.

Portraits of North American Indians, with Sketches of Scenery &c., painted by J. M. Stanley. Presented by the Smithsonian Institution.

The History of the Great and Mighty Kingdom of China and the situation thereof. Edited by Sir G. T. Staunton, Bart. Hakluyt Society.

An account of Meteorological Observations in four Balloom Ascents, made under the direction of the Kew Observatory Committee of the British Association for the advancement of science. By John Welsh, Esq. Presented by the author.

Report of the Kurrachee General Library and Museum. Presented by the Commissioner in Scinde.

Charts.

Chart of the discoveries of the Arctic Seas up to the year 1852. Presented by Dr. Norton Shaw, Secretary Royal Geographical Society.

The following very valuable collection of charts was presented by Admiral Sir Francis Beaufort, Hydrographer to H. M's Lords of the Admiralty, London:—Charts published at the Hydrographic Office, Admiralty, between July, 1852, and June, 1853.

SECTION I.

2154, Newhaven.
2128, Dennose to Christchurch.
2175, Poole Harbour.
27, Dartmouth, corrected.
1178, England, W. Coast, Sheet 2 corrected 1852.
38, Mildford Haven, corrected.
2159, Scotland, W. Coast, Sheet 3.
2174, Kyles of Bute.
2155, Sound of Mull.
2156, Lough Strangford.
48, Vidal Bank, corrected to 1852.
2173, Slyne Head to Liscanor Bay, Ireland, Sheet 10.
2096, Roundstone, Birterbuy, &c. Bays.
2125, Valentia Island.
2165, Tagus River, Entrance.

SECTION 2.

2151, Thames River, Sheet 4.
2167, Cromarty Firth.
2170, Dornock „
2181, Scotland, E. Coast, Sheet 5.
2180, Orkney Islands.

SECTION 3.

2138, Ports in the Baltic.
2150, Baltic Sea, Sheet 1.

SECTION 4.

2158, Mediterranean Sea, with 3 Plans.
148, Port Mahon, corrected to 1852.
2127, Keith Reef and Sherki Patches.

SECTION 5.

2177, Baffin Bay, Sheet 1.
2118, Discoveries in the Arctic Sea, to 1852.
2163, Ganso Harbour.
345, Nova Scotia, corrected to 1852, Sheet 7.
346, Do. „ „ 8.
2171, Sable Island.

SECTION 7.

2157, Antiqua Island, Sheet 3.
2097, Bocas de Dragos, with Plan of Port Spain.

SECTION 8.

544, Santa Catherina Id. Anchorage, corrected to 1852.

SECTION 9.

2139, Port Nuevo.
2145, W. Coast S. America, Sheet 25.
2146, Do. „ 26.
2147, Do. „ 27.
2148, Do. „ 28.
2168, Queen Charlotte Sound, Port Kuper, &c.
2153, Beaver Harbour.
2172, Behring Strait, Sheet 3, 1853.
2164, Point Barrow and Port Moore,

SECTION 10.

2982, Africa, S. Coast, Sheet 1, corrected.
2126, Bird Islands, and Doddington Rock.

SECTION. 11.

2135, Irawady River, Sheet 1.
2136, Do. 2.

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2137, Gaspar Strait, with its three Channels.
2149, Banca and Gaspar Straits.
2160, Carimata Strait.

SECTION 12.

2140, Royalist Haven.
2134, Brunl River, Entrance.
1270, China Sea, corrected to 1853.
2169, Tambelan Islands, and St. Esprit group.

SECTION 13.

1061, Australia, South Coast, Sheet 3, corrected to 1851
2152, Troubridge Shoals.
2141, Australia, East Coast, Sheet 1.
2142, Do. „ 2.
2143, Do. „ 3.
2144, Do. „ 4.
2176, Jervis and Bateman Bays.
2179, Botany Bay and Port Hacking.
2166, Broken Bay.
2130, Port Davey.

SECTION 14.

2161, Owaarre Harbour.

DIRECTIONS, &c.

Gulf of St. Lawrence, from 209 to 233.
Australia Directory, Vol 1, 1853.
Diagrams and Table for deducing the Meridian Altitude from Two Altitudes, 1852.
Deviation of the Compass, 1852.
Catalogue of Charts, 1852.
Tide Tables, 1853.
British Lights, 1853.
French, Spanish, and Portuguese Lights, 1853.

METEOROLOGICAL OBSERVATIONS.

From the Surveyor General's Office, Calcutta, from May to December 1852.

From the station of Bangalore, Calicut, Cannanore, Cochin, Coimbatoor, French Rocks, Hurryhur, Madura, Mangalore, Mercara and Palamcotta,—from May 1852 to 1853.

From the stations of Bellary, Chittoor, Cuddalore, Cuddapah, Guntoor, Jaulnah, Kamptee, Kurnool, Mergui, Nellore, Salem, Secunderabad, St. Thomas Mount, Penang, Tavoy, Trichinopoly,—from May 1852 to September 1853.

From Alibag, Ahmedabad, Bhooj, Broach, Bushire, Dharwar, Kolapoor, Pahlunpoor, Sawunt Waree, and Surat,—from January 1852 to September 1853.

From Sattara,—March 1853 to November 1853.

From the Ports of Cuddalore and Coconada,—from March 1852 to Oct. 1853.

Register of an Anemometer fixed at the Artillery Depot of Instructions in the Fort of Ahmednuggur, by Captain J. Pottinger, from June 1852 to Dec. 1853.

Ditto ditto fixed at the Sappers and Miners' Stores in Poona, by Captain T. Studdert, from April to November 1853.

Names of Members elected from June 1852, *to* 1*st January* 1854.

COMMODORE SIR HENRY LEEKE, R. N., K. H.—Proposed by Captain G. Jenkins, I. N., and seconded by John Smith, Esquire.

H. E. LEEKE, ESQUIRE.—Proposed by Captain G. Jenkins, I. N., and seconded by John Ritchie, Esquire.

DR. JOHN FORBES WATSON.—Proposed by Professor Patton, and seconded by Dr. R. Haines.

G. J. BOWYER, ESQUIRE.—Proposed by Thomas L. Jenkins, Esquire, and seconded by Dr. Buist, Secretary.

DR. BHAWOO DAJEE.—Proposed by Venayekrow Jagonnath, Esquire, and seconded by Captain Jenkins, I. N.,

DR. NARAYEN DAJEE.—Proposed by Dr. Buist, and seconded by Ali Mahomed Khan, Esquire.

PROFESSOR R. S. SINCLAIR, A. M.—Proposed by Dr. Bhawoo Dajee, and seconded by John Smith, Esquire.

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Annual Statement of Receipts and Disbursements of the Bombay Geographical Society, from 1st May 1851 to the 30th April 1852.

1851		DISBURSEMENTS.				
April	30	To Office Establishment		600	0	0
		„ Printing Society's Transactions Vol. x.		700	0	0
		„ Remittance of £ 50 favor Messrs Smith Elder and Co., for a Chronometer for Mr. Mayes		510	10	3
		„ Remittance of £ 131-3-2 favor Adie and Sons to account of instruments		1,399	0	4
		„ Contingent Expences		417	2	0
		„ Treasurers's Commission on Payment up to 31st July 1851. Rs. 2721-10-3 at 1 per cent as per their statement		27	3	5
		„ Balance in the hands of the Treasurers	1,200-1-3			
		„ Balance in the hands of the Secretary	10-3-9			
				1,210	5	0
		Total Rupees		4,864	5	0

1851	RECEIPTS.				
April	By Balance in the hands of the Treasurers as per last year's statement	1,751 1 1			
	„ In the hands of the Secretary	51 10 11			
			1,802	12	0
	„ Government Grant at Rs. 50 per mensem		600	0	0
	„ Annual Subscription of Members		1,115	0	0
	„ Society's Printed Transactions sold		93	12	0
	„ Admiralty Manual		7	0	0
	„ Interest allowed by Messrs Remington & Co., as per their statement		70	12	0
	„ Philosophical Instruments on account of, from several gentlemen		1,175	1	0
	Total Rupees		4,864	5	0

Bombay, 1st May 1852.

Errors Excepted.

(Signed) GEORGE BUIST,

Secretary to the Society.

I have carefully examined this account and find it correct.

12th June, 1852.

(Signed) NORMAN OLIVER.

19th June, 1852.

(Signed) ROBERT HAINES.

„ GRIFFITH JENKINS.

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Annual Statement of Receipts and Disbursements of the Bombay Geographical Society, from 1st May 1852 to 30th April 1853.

		DISBURSEMENTS.						RECEIPTS.					
1852 April	30	To Office Establishment			600	0	0	1852 April 30 By Balance in the hands of the Treasurers as per last year's Statement	Rs. 1,200	1 3			
		„ Printing Society's Transactions, vol. X			430	0	0	„ Ditto in the hands of the Society	10	3 9	1,210	5	0
		„ Remittance of £50, favor Adie and Sons, Edinburgh, on account of Instruments			516	2	1	„ Government Grant at Rs. 50 per mensem			600	0	0
		„ Contingent Expences			233	15	2	„ Annual subscription of Members			870	0	0
		„ Treasurer's Commission on payments up to 31st July, 1852, Rupees 1,915—2—5, at one per cent			19	2	5	„ Subscription to Dr. Krapf's Researches			20	0	0
								„ Society's Transactions sold			8	0	0
								„ Admiralty Manual			7	0	0
1853 April	30	„ Balance in the hands of the Treasurers	Rs. 1,002	3 5				„ Interest allowed by Messrs. Remington and Co., as per their Statement			47	6	8
		„ Balance in the hands of the Secretary	Rs. 37	12 7	4,040	0	0	„ Philosophical Instruments on account of, from several Gentlemen			76	8	0
		Total Rupees			2,839	3	8	Total Rupees			2,839	3	8

Bombay, 1st May 1853.

Errors Excepted.

(Signed) GEORGE BUIST,

Secretary to the Society.

I have carefully examined this account and find it correct.

(Signed) GRIFFITH JENKINS.

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TRANSACTIONS

OF THE

BOMBAY GEOGRAPHICAL SOCIETY.

ART. I.—*Reports on the Geological Survey of the Belgaum Collectorate.* By Lieutenant AYTOUN, of the Artillery.

No. 4465 of 1853.—GENERAL DEPARTMENT.

To the Secretary to the Geographical Society.

SIR,—I am directed to transmit to you the accompanying copies of reports drawn up by Lieutenant Aytoun of the Artillery, now engaged on a Geological Survey of the Belgaum Collectorate, and to state that the Right Honorable the Governor in Council has no objection to their being published, should the Society see fit to include them in their "Transactions."

2.—I am at the same time desired to send you the accompanying specimens (of Iron Ore from Malwan, and of Garnet and Ruby rock from Vingorla) received from Mr. Aytoun, with a request that you will be good enough to examine them and favor Government with any observations upon them which you may think useful.

I may add that a sample of sand from the Mulpurba river, said to contain gold dust, was also received from Mr. Aytoun. The Assay Master, however, states that there is no gold in it.

I have the honor to be, Sir,
Your most obedient servant.
J. G. LUMSDEN,
Secretary to Government.

Bombay Castle, 27th December, 1852.

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To J. D. Inverarity, Esq.,

Political Agent Southern Maharatha Country.

Sir,—Acting on the information which you had obtained in your tour through the districts regarding the localities where gold was reported to be washed by the Natives during the rains, I left Belgaum on the 5th June, and proceeded direct to Byl Hongul and Belwuddee in the basin of the Mulpurba.

On the morning of the 10th I started at day light for the Nullah near Chikop, a few miles North East of Byl Hongul, and about twenty five miles nearly due East of Belgaum. I was accompanied by a washer of Goldsmith's refuse, who had with him a circular shallow dish for washing the gravel.

I reached the Nullah at a point where Chlorite slate in nearly vertical strata was developed at right angles to the course of the stream [illegible]h here flowed to the East. The bed of the stream was very shallow and occupied the depression between two gentle undulations covered with a foot or two of black soil (Regur.)

BED OF STREAM.

Moving up the stream I observed in several places a collection of black iron grains, and the pebbles in the bed were quartz, jasper, several kinds of iron ore and concretionary limestone.

Having arrived at a bend of the stream, circular sweepings were seen on the surface of the gravel, and these, I was informed, had been made by the gold washers a few days previously. Trying some of the gravel here, the first basinful yielded two minute grains, fine gold, which under the lens appeared to have their angles much worn by attrition. After the washing process has been completed, there remains behind a black iron sand, very much resembling fine grained sporting gunpowder, and water being allowed to drop upon this, the yellow grains of gold come out prominently from the dark ground of iron sand.

Several trials were made near this with like success, a basinful of gravel containing in general one or two minute grains or scales.

* Chlorite slate exposed in bed.

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Higher up, at the village of Moorhoomhee, the stream bifurcates, and finding here a gold washer and his son, who had that morning come from Moorgoor, a village near the source, I took them with me and went up the right branch. The gravel here proved to be auriferous also.

The following day, I proceeded to a point a few miles higher up this branch; and reached the stream where the left bank was perpendicular and about ten feet high, the opposite bank being formed by the gentle slope of a cotton field. Chlorite slate was here exposed, much disturbed and indurated. Underlying the black soil there was gravel and marl, and below that deposit, conglomerate limestone apparently rested on the chlorite slate. The gravel in the bed of the stream contained gold.

I regretted being unable to trace the stream to its source in the hills at Moorgoor, but the monsoon having set in, the heavy rain which fell after this last visit to the Millak, rendered the black soil all but impassable; and as I was at that time suffering from sickness, I was the less able to endure great fatigue.

I next proceeded to Belowuddee on the south side of the Mulpurba, where I remained two days.

The streams flowing through detritus occupying a depression between two parallel ridges composed of metamorphic rocks contained gold. Here the black soil had below it a bed of angular gravel from two to five feet thick, and this rested on a decomposed felspathic rock.

With the exception of chlorite slate being here supplanted by red argillaceous schists and felspathic rocks decomposed, the geological conditions were the same as at Byl Hongul.

At Dharwar I obtained information from Captain Wingate which led me to change my route, and instead of going by Pursgurby to the Northern Districts of the Belgaum Collectorate, I proceeded via the Rupputgood hills.

I reached Dumul on the East side of the hills on the 4th of July, and the weather being thus very boisterous I confined my operations to the vicinity of that village. Finding gold on the surface gravel in the bed of the stream which flowed past Dumul, I sunk a shaft in the

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gravel in order to ascertain if the metal existed in greater proportion below and in the interstices of the bed of the rock, which was here gneiss.

At the depth of seven feet and before the rock had been gained, further progress was stopped by the flow of water which could not be kept under by baling. Gold in very small quantities was found at all depths, but not more below than immediately on the surface.

I made many trials in the streams which flowed into this main one, from both sides of the valley, but although there was abundance of black iron sand (which is often an indication of the presence of the more precious metal in auriferous districts,) I did not succeed in finding a grain of gold.

On crossing the hills, however, by the Saltoor Pass a more cheering prospect was in store. This pass lies between the principal range of the Rupputgood and a system of Hills to the north forming a prolongation of the range. The rocks of the one differ in some degree from those of the other, thus in the central and main range I met with no chlorite slate, while in the hills about Saltoor and Serhuttee, it is the principal stratified rock.

The streams flowing from the west side of these hills (to the north) all contain gold. They flow through a coarse angular gravel which extends from the flanks of the hills for some distance into the plain, and underlies the black soil. At Saltoor I washed gold from the gravel of several of the streams, and at Serhuttee, wherever a flow of water through a field had carried away the soil and exposed the bed of gravel, there gold was met with.

I ascertained from the gold washers settled at these villages, that for a distance of ten or twelve inches in a direction north and south, the streams are auriferous. But proceeding south, Granite is seen rising in bosses through the soil. Here the gravel ceases to be auriferous.

At an interval of thirty or forty miles, gold again makes its appearance at Chin Moolgoond, and several streams in that neighbourhood, as I learned from Captain Wingate and some gold washers who came from that quarter.

Returning to the East side of the hills I traced the Dumul stream to its source, and found it had its rise among the hills whose Western side contained the auriferous gravel; and that it was not until the dip of the beds changed from East to West and the underlying rocks were

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Chlorite slate, and Talcose slate, that the streams joining it from both sides furnished gold. On a more extended acquaintance with the geology of the District, I thus discovered that my first operations at Dumul were undertaken at a point where the detritus was not auriferous, and where the small quantity of gold which was there found in the bed of the stream had travelled down from the auriferous tract, among the hills of Chlorite slate and trap. The red Argillaceous schist and slate, which are the rocks covering the flanks of the main range, and which also enter into the composition of some of the outlying hills, are very similar to the rocks at Belowuddee they are associates of the Chlorite slate.

About five miles from Saltoor, on the top of a hill about 200 feet high, composed of this red schist, there are twenty two pits of a circular form, from three to four feet in diameter, and from 18 to 25 deep.

This hill has the name of Julgurgood (Gold Washer's Hill) in allusion, doubtless, to the supposed object for which these excavations were made; they did not appear to me to be of any great antiquity, but none of the natives from whom I made enquiry could tell me any thing about them.

Captain Newbold mentions some pits sunk by Tippoo in this part of the country for gun flints. These may be the excavations he refers to. Something must have been obtained from them, or so many would not have been sunk. The debris has been almost entirely removed. In the central range of the Kupputgood there are two hills bearing the names of 'Great' and Little Gold mountains. I had only once an opportunity of being near the latter while going through the Kupput Ischerura Pass. In a ravine which descended from this hill, quartz and iron ore were the only minerals visible (and gold is most frequently associated with those two.) I had no gold washer with me to try the gravel. A tradition exists among the people that in bye gone days, gold was extracted from the rocks by the process now adopted in the manufacture of iron, that is, by breaking the ore into small pieces or powdering it, and smelting it in a small furnace.

It would have been satisfactory to have ascertained the proportion of gold to a ton of sand in the gravel on the West side of the Kupputgood hills; but I may here mention that I failed in my attempts to induce two or three coolies to enter my service before leaving Belgaum, and on getting into the districts no assistance could be obtained there.

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I found as the people are wholly engaged in the cultivation of the land, and will not take any other work.

Again the goldwashers gave their services with great reluctance and were frequently absent when most particularly wanted. I was, from want of assistance, compelled to confine my experiments on the gravel to the determination of the fact that gold existed in certain localities.

It would have been still more satisfactory to have detected the metal in the rocks, but it is no cause for despondency that it has not been detected, for in the great auriferous tracts of the world it rarely presents itself in the rocks on the surface, and it was only after a much more continued search than I have made that it was discovered in the quartz of Australia.

In the Southern Mahratta Country the geological conditions necessary for the development of gold are present, and that the metal is extensively distributed over these districts is an established fact; but further researches, and these more particularly of a practical nature, must be undertaken before it can be determined whether a remunerative gold field exists. As it is in the coarse angular gravel or local drift so abundant on the flanks of hills in a great many parts of the Belgaum and Dharwar collectorate that digging should be made, the experiments should neither be costly nor difficult to undertake.

In the event of your concurring with me in thinking that this subject merits further investigation, I propose again proceeding to the basin of the Mulpurba, and taking with me the means necessary for prosecuting researches of a practical character, and to commence with the hills about Moorgoor, which I think a promising field.

On examining the progress of gold discovery in California and Australia, it will be found that until diggings had been made, the highly auriferous character of the gravel was not apparent. In California, Geologists had traversed the ground and laid down the geological features of the country, without being aware of the fact that gold existed at all in the rocks, and in Australia, the first discoverer, Dr. Carkel, was able merely to announce that the metal had been found by him in very small quantities.

It may be said that even supposing nature had originally produced the metal here in great abundance, yet the fact of a dense population having been settled in the land from the earliest ages is against the

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probability of any large amount of the metal having been left in the ground.

If, however, this indeed be the veritable Ophir, an opinion at which Cart Ritter and other eminent men have arrived, I think we may reasonably doubt that the diggers of Solomon's time or their descendants, could not have had so perfect a knowledge of the conditions on which the distribution of gold depends, as to have completely exhausted a great gold field.

Annexed to this is a general description of the structure of the country, in which the gold is met with in the basin of the Malpurba and the Kupputgood hills.

I have the honor to be, &c.,

(Signed) A. AYTOUN, Lieutenant, Artillery
On special duty.

Belgaum Districts, August 1852.

Postscript on the Professional Goldwashers.

Under the name of (Julyar) are included two classes of goldwashers.

1st.—The washers of Goldsmith's refuse who are to be met with in most towns and even villages.

They are sometimes the servants of Goldsmiths, procuring clay and manufacturing crucibles for him as well as washing the refuse of his workshop. To this class also belong a nomade race of julyars who go from village to village and generally purchase the refuse, and being thus of a more speculative turn than the others.

2nd.—The stream goldwashers, some of whom are settled on certain nullahs and regard them as private property as far as the gold is concerned.

In the basin of the Mulpurba there is only one goldwasher and his son, avowedly practising the trade. He is a Mussulman, and has followed the profession of his father and grandfather, both of whom derived their bread from the auriferous gravel of the affluents of the Mulpurba.

The goldwasher at Belowuddee died not long since, and no one has succeeded him.

I was assured by an intelligent native at Saltoor, that since the

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liberal assessment of the land introduced by the Revenue Survey, many of the goldwashers in that part of the country, had taken to the cultivation of the soil as a more certain means of gaining a livelihood, than the precarious one of gold seeking.

It is not improbable that the knowledge of certain streams containing gold has been lost by the goldwashers dying, or abandoning their trade when the gold washing ceased to be remunerative.

To this class also belong a wandering set of washers. Their occupation is, however, mysterious, for although I have met with many of them, they never appeared to be at work, and although maintaining that they did not realize more than two or three rupees from their labour in a month—yet I could scarcely get them to work for me at three times that rate, and they would not remain with me more than a day or two. Some of these even came here from Bellary and Humpa, in the Madras Presidency.

The settled goldwashers use a trough about four feet long and nine inches high, with a breadth of rather more than a foot; for washing the gravel, it is propped up on stones in a sloping direction on the bank of the stream and while one man throws in baskets full—of gravel, the other stirs it up with his hand and pours water on it. The larger gravel is thrown out, and the process is completed in a circular shallow dish about eighteen inches in diameter and four inches deep. The trough corresponds with the cradle used by Europeans, the circular dish with the prospecting pan.

Having collected a certain amount of gold dust (for small unggets are extremely rare) the goldwasher amalgamates it with mercury, and having sublimed the latter on charcoal, he sells the gold to the Shroff.

Geological structure of the basin of the Mulpurba Belgaum district.

The basin of the Mulpurba is bounded on the west by the last ridge of the great overlying trap formation of the Deccan. On the north by the sandstone hills of the Gokank bell, which here sends an offset to the south, meeting an elevated Bell of Schistose rocks which forms the eastern boundary.

The river Mulpurba in its course to the north east has forced a passage through the sand-hills near Pursgurh.

The trap range on the west is about 400 feet high. The elevated

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tract of schistose rocks on the east has a general elevation of nearly 300 feet above the level of the river, and on this elevated ground are situated Taggoor, Kittoor, and Dharwar. The water-shed runs in a direction nearly E. N.E., from Kittoor to Pursgurh. The rocks met with in the basin are the Hypogear schists principally, and they predominate in the following order, proceeding eastward.

Micaceous schist, Talcose schist and slate and Chlorite schist and slate ;—associated with the Mila schist in one part of the basin there is a clay slate, and in the Chlorite slate district there is a red argillaceous rock, sometimes thick bedded, at other times appearing finely schistose.

All the rocks have been subject more or less to the disturbing and metamorphic effect of igneous agency which appears to have been at work not far below them. Trap and Syanite are developed in many places throughout the basin, and are frequently visible in nullahs and depressions. I did not, however, meet with any hills composed of these igneous rocks, although about Hoobly and Taggoor the trap is seen projecting from the surface in long ridges, which being jointed by planes at right angles appear like lines of blocks. The trap a few miles from Hoobly assumes quite a different aspect from any varieties I have meet with in the great Basaltic district.

It is here a crystalline greenstone with white and light green colors. It retains the same characters wherever I have met with it among the Schistose rocks. Specimens from Dharwar, the Kupputgood hills, and Baghulkot, all present the same appearance. It is sometimes porphyritic, long needle crystals of felspar traversing it.

Having thus broadly laid down the geological features of the basin, I now proceed to give a few details regarding the structure of certain parts which came under my observation.

Proceeding from Belgaum to Dharwar the road lies across the trap range which forms the western boundary of the basin.

On descending the east side of this hill the first thing which strikes the attention is the abundance of fragments of iron ore of a schistose structure, and quartz. Many of the fields are covered with those fragments which subsequent observation shews to have come from large ridges of ferruginated and quartified schists.

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THE KUPPUTGOOD HILLS.

At Dumul the main range of the Kupputgood is about one thousand feet high. It presents a bold and almost linear outline, in which respect it differs most strikingly from the mammiform and conical outlying and subordinate ranges.

The sides are exceedingly steep, and are covered by red argillaceous slate, which on the east side is converted into a quartz and iron slate. The nucleus of the hill, which I suppose to be granite, is not, so far as I am aware, uncovered, but on the east and west granite is largely developed. Between Dumul and this main range there are two outlying ranges having a direction N. N. W. They are composed of talcose and micaceous slate of a highly quartrose character. Intercalated, too, among these are beds of altered slate converted into iron ore.

Mica slate and Gneiss appear at Dumul, and are the rocks principally met with in the plain which extends from the Kupput Hills northwards to the sandstone at Badamee and Gudjundughur.

Red Felspur Granite and Syenite are seen in veins and dykes traversing the Gneiss.

In the section of the Saltoor Pass which lies between the main range and a system of hills to the north, a prolongation of the range, it will be seen that trap makes its appearance in many places.

At Dumul a trap Porphyry is seen among the Gneiss, also dark spheroidal trap. Between that and Dhonee the trap is in general decomposed, it is mostly of the spheroidal variety, and there is a great deal of kimkir associated with it.

In many places near the trap intrusions, the Schistose rocks form a brecchia cemented with the kimkir on the glaces of the outlying range; next to the plane there is a depth of two to three feet of a concretionary limestone imbedding quartz, &c.; it is extremely hard.

In crossing the Hills by the pass, the dip of the rocks which is east on the Dumul side changes to west about two miles beyond the village of Dhonee. The rocks there met with are talcose, and mica schist, red argillaceous schists, and lastly chlorite slate in general greatly altered by the intrusion of greenstone. It is among the chlorite slate hills on the west that the gold is found.

The greenstone has in many places undergone disintegration; and although externally it has merely a dark weathered appearance, yet

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when struck with the hammer it gives a hollow sound, and on being broken is found to be quite light, having apparently been acted on by an agency quite distinct from that of the atmosphere, whole hills of it being (to the core) quite rotten.

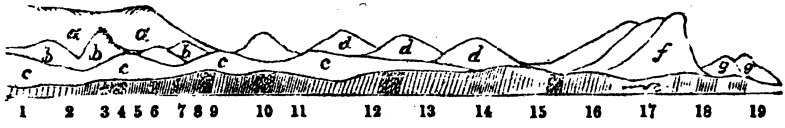
The chlorite slate is highly quartrose and indurated, and it is difficult occasionally to discriminate between this slate and the igneous rock which has occasionally been ejected between the strata.

The development of Iron Pyrites is exceedingly great in the gold region; and were it not that all the conditions on which the large development of the precious metal depends are here found in conjunction with the Pyrites, it might be imagined that the small quantity of gold now found in the nullahs in this part of the country was derived from this source,—Iron Pyrites, as is well known, often yield a small amount of gold.

I have occasionally met with small pepites of gold of a pear shape, and so smooth that at first I thought they must have come from the goldsmith's furnace; but I subsequently met with them in gravel removed from villages, and where it was impossible to conceive that an artificial product of this kind could have found its way.

I have lately learned that the gold in Australia, when found in small pieces, has this appearance, looking as if it had undergone fusion in a furnace.

E *Section through Soltoor Pass.* W



1. Gneiss and Hornblende schist.
2. Spheroidal basalt decomposed.
3. Mica Schist with quartz veins.
4. Basalt.
5. Mica Schist and quartz.
6. Trap.
7. Talcose Schist and quartz.
8. Trap and brecchia of Schist.
9. Mica Schist and quartz.
10. Trap and brecchia of Schist.
11. Talcose Schist and quartz.
12. Mica Slate.
13. Trap and much Iron ore.
14, 15, 16. Schists alternating with Trap.
17, 18, 19. Chlorite slate and trap (Greenstone.)

a.a. Main range of the Kupputgood red argillaceous slate and schist, silicious and Iron schists.
b.b. Outline range composed of talc and mica schist, red argillaceous schist, silicious and Iron schist.
c.c. Outline parallel to the above, and composed of the same rocks.
d.d.d. Red argillaceous schist and slate converted into Iron ore.
f.f.f. Argillaceous slates, red and grey, with much iron pyrites in them.
g.g. Hills of decomposed slaty Greenstone in chlorite slate district, gold region.

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Outline of the Hills on the side which has the Auriferous gravel—the West.

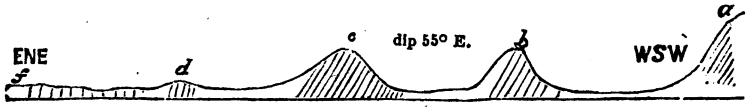
Section at the point R.

1.—Granite covered with black soil, Anigeeree.
2.—Laterite and red soil.
3.—Jaspideous bands N. by W.
4.—Talcose Schists.
5.—Mica slate, decomposed on the surface.
6.—Gneiss, Mica slate, &c., covered with black soil.

Outline of the Kupputgood from the Dumul side.

1,000 feet above the plain.

Section at right angles to the above.



a. This face is completely covered with debris of silicious and Iron schist.

b. Is composed of talcose and micaceous schists, but from large beds of Iron schist is covered with thin debris.

c. Has at 1 a band of iron schist 60 feet thick, then beds of micaceous and talcose slate full of quartz veins.

d. A low hill having talcose quartz, and hornblende gneiss. *f.* Gneiss, Mica slate, hornblende schist.

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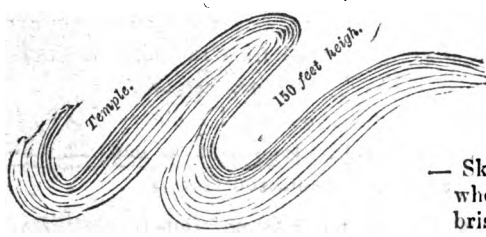
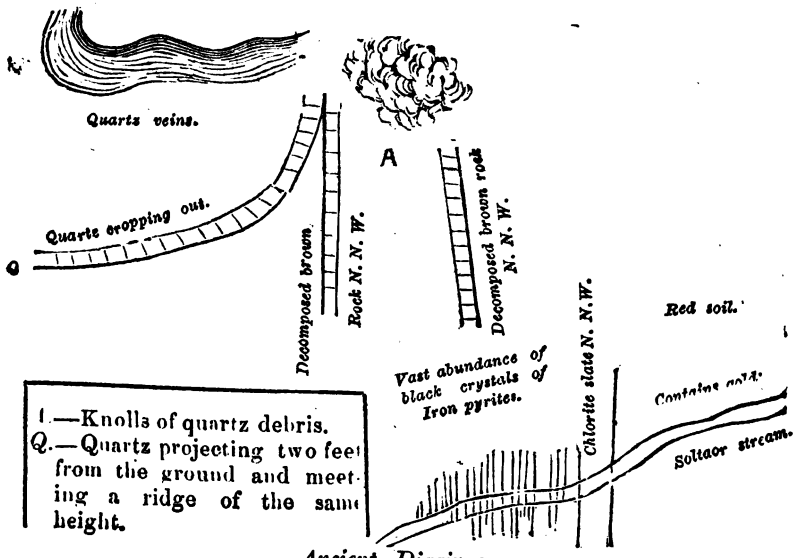
Hills of decomposed slaty rock, broken into blocks containing Iron pyrites.



— Sketch plan of the ground where knolls of quartz debris are meet with.



I.—Knolls of quartz debris.
Q.—Quartz projecting two feet from the ground and meeting a ridge of the same height.

Ancient Diggings.

At the point A. the ground looks as if it had been broken up by diggings.

There is a congeries of knolls a few feet in height and close together. On washing a basket full, a large amount of red soil was found to be mixed with the quartz, although nothing but quartz

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pebbles, about an inch in diameter and angular, appeared on the surface. Cubical and octahedral crystals of iron ore abounded in the detritus, but no gold was found. About half a mile from this the stream yields gold.

The whole of the intermedite ground from the hills to the stream is covered with detritus of quartz, greenstone, iron ore.

At one other place in this neighbourhood I observed the ground broken in a manner not unlike this. It was at the foot of a hill near Julgargood; the detritus has quartz and iron ore.

(Signed) A. AYTOUN, *Lieutenant, Bombay Artillery.*

On special duty.

(True Copy.)

(Signed) J. G. LUMSDEN,

Secretary to Government.

ART. II.—*Report of a Survey of the Taptee River, by* MR. EDWARDS.

No. 4279 of 1852.—GENERAL DEPARTMENT.

To the Secretary to the Geographical Society.

SIR,—I am desired by the Right Honorable the Governor in Council to request the Society's acceptance of the accompanying copy of the report of a Survey of the Taptee river, by Mr. Edwards.

I have the honor to be, Sir,

Your most obedient servant,

J. G. LUMSDEN,

Secretary to Government.

Bombay Castle, 30th November, 1852.

To the Collector of Khandesh.

SIR,

Collector wishes for an early report.—As you are anxious to lay before Government at once, the result of my survey of the river Taptee, made during the months of March, April and May last, I have

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the honor to submit the following succinct report, in anticipation of the detail plan, estimate, and general report being prepared.

2nd. *Assistance allowed, and the plan adopted in carrying out the survey.*—Before proceeding with the report, it might be as well to describe the assistance, and the instruments, that I had at my disposal, and the system I adopted in carrying on the survey.. I was allowed Rs. 54 per month for assistance, and was supplied by the chief Engineer with a 4-in. Everest theodolyte, a Dumpy spirit level, and a hundred-feet brass measuring chain, and I also received an allowance of Rs. 100 for a boat for the purpose of taking soundings, &c. I procured a boat 15 feet in length, 4 feet 4 inches wide, and which drew one foot of water with no one in it. The plan I found most convenient and expeditious in surveying was, to take either fore or back angles, or both, as circumstances admitted, with the theodolite from the meridian, to chain up between the stations, and to take offsets to the right and left of my case line, with 10-feet offset rods, keeping the boat advancing parallel to the chain, and the men in it giving out the depth of water from time to time.

3rd. *Proposition for the navigation, by whom made, and the survey sanctioned by Government.*—It was in December, 1850, being then employed in the Civil Engineers' Department, that I first proposed my scheme for the navigation of the Taptee; and in my letter to the Civil Engineer, dated 31st December, 1850, requested that, should he think well of my scheme, he would submit it for the favorable consideration of Government, at the same time volunteering, should there be *no other* person available, to make a preliminary survey to ascertain the feasibility of my plan.

4th. Government, in Mr. Secretary Lumsden's letter, No. 2279, dated 31st May, 1851, approved of my proposal, and sanctioned my being appointed to conduct the survey. The time for doing so, however, having passed for that season, I fixed, in accordance with para. 2 of Mr. Lumsden's letter, on February last, as the most suitable time to commence. In July, 1851, I was appointed Superintendent of Cotton Experiments; and soon after my arrival here, to take up my new appointment, Lieutenant Bell, in his letter No. 559, dated 1st August following, informed me, that my connection with the Engineers' Department having ceased, the arrangement sanctioned by Government,

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by which I was to have proceeded for three months, on full pay and batta, to survey, and report on the course of the Taptee, during the dry season of the year, would no longer hold good, at least with reference to his department; and recommended me, if desirous of following out the proposed scheme, to lose no time in making a fresh arrangement through my own immediate superiors, so that I might be able, under a new sanction from Government, to proceed on the survey in the dry season of 1852.

5th. As recommended by Lieutenant Bell, I did not make a fresh application, as I considered it would be out of my province to do so, my connection with the Engineers' Department having ceased, and moreover knowing that, in order to complete the survey, it would entail the necessity of my absenting myself from my duties in the Cotton Department for upwards of three months; but on the receipt of your letter, No. 1571, dated 16th October, 1851, I did not hesitate to comply with your wishes, and willingly undertook to make the survey to ascertain the practicability of rendering the Taptee navigable, little thinking at the time of the severity of the undertaking, the vast risk I subjected my health to, and of the outlay of between 700 and 800 Rs. of my own funds in carrying on the survey,—and all this I did without an increase of a fraction to my pay. Such employment I would not undertake again in this country, however well I might be remunerated.

6th. The Right Honorable the Governor in Council, in Mr. Deputy Secretary Richardson's letter, No. 84, of the 20th January, 1852 again authorizes the survey being made by me, which I accordingly, commenced in March, and finished in May last.

7th. *Where the survey commences and terminates.*—I had originally intended to have commenced the survey at the junction of the river Poorna with the Taptee, but the Revenue Commissioner, Mr. Fawcett, from his local knowledge of the Taptee about Rumgam, told me when he was at Dhurrumghaum the last cold season, that it would be quite high enough up if I was to start somewhere opposite Yawul. Acting therefore on his advice, I commenced at the junction of the Wangor river, which is the eastern limit of Khandeish; on the left, or southern bank of the Taptee is the road from Saugor in Bundelchund, through Hossungabad, Asseergheer, Sowda, Errumdole, and Malligaum

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to Bombay crosses the Taptee at this place, and I terminated my survey on the beach to the N. N. West of Surat; and about half way between it and the village of Randier, on the right bank of the river, the flagstaff on the castle bearing 156°.04′.

8th. *General description of the river and the country it flows through.*—The general character of that portion of the river Taptee which I have surveyed, 232 miles in length, is pretty much the same throughout. The floods in the rains acting with greater force on the concave side of the river, throw up the gravel into shoals at the points where the river commences to change its course in an opposite direction, by which are formed, in the dry season, a continuation of deep pools, having no visible current, on alternate banks; as they become the concave side of the river averaging a mile and a half in length, and some are even as long as ten miles. The water, as it flows in numerous channels with a velocity of from two to three miles an hour over the gravel shoals, has a general width of from 150 to 300 feet, and a varying depth of from 1 foot to 6 inches to 9 inches.

9th. Near Thulnair, in the month of April, I found the volume of water then flowing to be equal to a stream sixty feet wide, two feet deep, running at the rate of two miles an hour.

10th. In the province of Khandeish the banks are about sixty feet high, consisting of an upper and lower one; the upper is composed of black earth, and is on a level with the surrounding country; but the lower bank is of yellow earth, and is very much cut up into ravines. As we advance into the Daung jungle, the spurs from the Sautpoora hills, and the tail of the Western Ghauts, converge towards the river, the banks become very high, as much in some places as 150 to 200 feet, and its previous character of an upper and lower bank has disappeared. On emerging out of the Daung jungles into Guzerat, the banks are low, and the river widens very considerably, hitherto being from 800 to 1200 feet in width, but which is now from 1,500 to 3,000 feet.

11th. The bed of the river throughout is fine gravel; with the exception of at those places where the few rock obstructions are met with, and which but seldom exceeded a mile and a half in length, there is nothing to prevent cattle from walking along the edge of the water, for the purpose of towing the boats. Not a single quicksand occurs in the whole length.

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12th. In the province of Khandeish, as far as Purkassa, the surrounding country is flat, and well cultivated; along the banks of the river villages are very numerous,—to be met with at almost every three quarters of a mile. At Purkassa, however, the jungle begins: the villages and the cultivation gradually disappear, until we arrive at Kookurmoonda, beyond which nothing but a few Bheel huts, in clusters of three or four, and an almost impenetrable jungle without a vestige of even a bullock track exists. The surrounding country is also rugged and hilly, and is very much infested with tigers: this state of country continues as far as Currunjah, a distance of seventy-five miles.

13th. I think that it was in a flood, fourteen years ago, that several of the villages in Khandeish, which were situated on the lower bank of the river, were swept away. The destruction of life and property was great, and those that had the good fortune to escape were left destitute. I have observed that in no instance had any village that was situated on the black earth suffered injury, whilst, almost without exception, those on the yellow earth suffered more or less; and in fact the inhabitants have now deserted several of their old villages, and founded new ones on higher ground.

14th. From Currunjah to Surat the river does not present any characteristic change, from what has been already said about it; the banks are considerably lower, and the bed a good deal wider, and as it approaches Surat it gets more tortuous in its course.

15th. Now that I have given a general description of the river, and in order to be the better able to give a more detailed account of its capabilities, with reference to my proposed scheme of navigating it, I shall retrace my steps once more to the commencement; and, for convenience sake, shall hereafter treat of it in the several divisions that the obstructions naturally divide it into.

16th. *Description of first division—from Wangore River to Adjunta, 49 miles 291 feet.*—This division commences at the junction of the Wangor River, on the line of road from Bombay through Malligaum, Errondole, Sowda, Boorhanpoor. Asseerghur, and Hossungabad to Saugor, and continues to opposite the village of Adjunta, at the beginning of the obstruction at the junction of the Boree river, a distance of 49 miles and 291 feet, without presenting any further hinderance to

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its being made navigable, than twenty-seven gravel shoals and one slight rock ledge.

17th. *Second division—Boree River obstruction,* 1 *mile* 795 *feet.*—The obstruction at the junction of the Boree River consists of rock extending more or less over a distance of one mile and 795 feet. Between the rocks several channels are to be found, but which at varying distances have been blocked up by the force of the water in the rains, wedging into the channels bolders of from one to four feet of cubical contents: there are also a few rock ledges. The expense of clearing away the bolders—cutting a passage through the ledges, and stopping up all the channels but one—will not exceed Rs. 1,500.

18th. *Third division—from Boree River obstruction to below Purkassa,* 58 *miles* 1575 *feet.*—From the end of the last obstruction to the commencement of the obstruction below Purkassa, a distance of 58 miles and 1,575 feet, the stream is in every respect the same as in the first division, the number of gravel shoals being thirty-six, and of rock ledges 9.

19th. *Fourth division—Purkassa obstruction,* 1 *mile* 3,020 *feet.*—This obstruction and that at the Boree River are very much alike; this one, however, being longer (1 mile 3020 feet), will cost more to clear it, and I have accordingly set down Rs. 2,500 for this purpose.

20th. *Fifth division—from the Purkassa obstruction to that commencing at Jappa Embly,* 20 *miles* 2,143 *feet.*—The river still continues the same as has been described in the first division, the only difference being that the rock ledges (equal to 1.900 running feet) have increased, whereas in the length of this division, which is 20 miles and 2,143 feet, there are only ten gravel shoals. In some parts, however, rocks appear in the middle of the stream, with deep water all around; this does not happen in any of the previous divisions, and will in nowise impede the navigation.

21st. *Sixth division commences at Jappa Embly, and ends at the termination of the Hirron Phal obstruction opposite Pippreepara,* 1 *mile* 5,120 *feet.*—At the commencement of this division, opposite Jappa Embly, the first obstruction occurs at which I had to use the spirit level. This obstruction is a rapid 605 feet in length, with a fall of 8.5 feet, or $\frac{1}{71}$ $\frac{1}{17}$, and shoots over four successive rock ridges. From here plenty of water flows between rocks and bolders, and after passing

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seven minor obstacles, reaches the greatest of all the obstructions met with in the whole course of the river—the "Hirron Phal obstruction," opposite the village of Pippreepara. The Hirron Phal obstruction is a rapid 725 feet in length, with a fall of 18.69 feet, or $\frac{1}{38.79}$. In the length of this rapid there are five ridges. I reckon that the whole of these obstructions, from their commencement at Jappa Embly to their termination at the Hirron Phal rapid opposite Pippreepara, a distance of 1 mile 5,120 feet, can be removed so as to make a passage for boats such as I shall hereafter describe, for the sum of Rs. 17,300. I take the opportunity of mentioning here, that I had not much difficulty in taking my boat through—the description and size of which I have given in the 2nd para: nor had I once, from the commencement of the survey at the Wangor river to its successful termination at Surat, to take the boat an inch out of the water.

22nd. *Seventh division—from the end of the Hirron Phal obstruction to that below Currunjah, 51 miles 3,423 feet.*—From the Hirron Phal obstruction the water gets into a deep basin, surrounded by high rocks, and from hence flows for about 2,500 feet in a channel eighty feet wide and of considerable depth, with high rocks on both sides, whence the rocks terminate; the bed of the river becomes gravel, and the stream assumes its former character; the left bank, however, becomes more rocky, and several dykes are now met with. Below Koktee there are several isolated rocks in the channel, which will cause but little obstruction, as there is plenty of water. At Koydah the bed of the river is rock for about a mile and a half; for a portion of the distance there are two channels, but the only obstacles are a few rock ledges, ridges of loose bolders, and at one spot the narrowness of the channel for about thirty feet length. On emerging from the rock the stream again winds in the gravel bed, past the fort of Baujrood to Currunjah, with only two intervening rocky portions, the one commencing below the deserted village of Kooroopora, and the other opposite the village of Kupoor, both of which presenting but slight obstructions. In the rocks opposite the village of Kupoor coarse grained freestone appears, being the only place on the whole river at which I have observed it. From the commencement of this division at the Hirron Phal to its termination below Currunjah, a distance of 51 miles 3,423 feet, 3,120 feet of rock ledges and 21 gravel shoals occur.

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23rd. *Eighth division—from the Currunjah obstruction ending at Wharriat, 1 mile 2,495 feet.*—This obstruction, like all the former ones, consists of the bed of the river being rock. The stream for some distance flows in one channel, when it separates into two and rejoins opposite the village of Wharriat, the one channel following the right bank, and the other the left. After carefully examining the two, I found that the one on the left bank was the best, though the greatest quantity of water flows through that on the right. The boat was also taken through the channel on the right bank. The only work required to render the channel on the left bank navigable will be the confining the water to the one stream, removing the loose bolders, one slight rock cutting, and another rock cutting 300 feet in length by a mean width and depth of 12 feet by 1 foot; the cost of executing which I estimate at Rs. 2,000.

24th. *Ninth division—from Wharriat to the obstruction below Kurrod, 11 miles 45 feet.*—Through this division the water is in very extensive pools, being both long, wide and deep. Opposite the village of Shar some rocks are met with, and below Maundwee several isolated rocks appear in the channel, but offer no obstruction, the only impediments being sixty running feet of rock ledges, and one gravel shoal.

25th. *Tenth division—commences below Kurrod at Kurreepoora, and ending below Kungaralee—8 miles 3,030 feet.*—This obstruction differs very materially from all the former ones. From its commencement to Cumlapoor the water occupies almost the whole bed of the river, and is studded with an innumerable number of isolated rocks, rising but a few feet above the surface, and having great depth of water on all sides. By looking down on these rocks from the top of the bank it at first sight puzzles one how a boat can pass through; but, by a closer inspection, it is easy to trace several good channels, winding between the rocks. In order, however, to make it easily and expeditiously passable, the channel must be properly defined, in some places straightened, and all the other channels must be blocked up.

26th. A little below Cumlapoor the river assumes exactly the same character as the eighth division: just above Cumlapoor the water passes through a large dyke in two narrow streams, which immediately rejoin, but soon after again separate into two,—one channel follows the right bank, and the other the left, with massive sheet rock between them to opposite the village of Bhaggugha.

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27th. I am not certain, on a closer examination, which of the two channels would be found the best: the boat passed through the one on the left, and I accordingly confined my attention to that channel.

28th. If the left channel is adopted, the work to be done will be, to turn all the water into it a slight clearing for 3150 feet, and a rock cutting of a mean width and depth of 12 feet by 1 foot, for 800 feet in length.

29th. From opposite the village of Baggaghaon the left bank to some distance below Kungaralee on the right bank, the description given in the 25th paragraph of the first portion of this division will also refer equally correct to this portion of it.

30th. The cost of overcoming the whole of the obstacles in this division I estimate not to exceed Rs. 7,000.

31st. *Eleventh division—from the obstruction that terminates below Kungaralee to Surat,* 21 *miles* 5,175 *feet.*—Immediately on leaving the last obstruction rocks continue in the channel for some distance, presenting, however, but slight obstruction. Before arriving at the village of Pipprew, one portion of the water runs in a stream towards the left bank, whilst the other flows nearly in the middle of the river. Nearly opposite Pipprew the left stream again divides in two, one portion running between the left bank and a lofty island about two miles in length, and which is thickly covered with Babool jungle, whilst the other portion rejoins, opposite Pipprew, the main stream that I have before said flowed in the middle of the river. After passing the island, the water is again collected into an extensive pool, with a few rocks here and there, to opposite Patna. In the rains boats from Surat come up to this place for the purpose of loading timber.

32nd. From Patna to Surat but very few obstructions occur. The bed of the river being gravel throughout, the pools are long, wide and deep. The spring tides affect the river to between Bhadda and Wharruck, and the ordinary tides up to Baracha. The number of obstructions in 31 miles 5,195 feet, the length of this division, is only equal to seventy running feet of rock ledges, and six gravel shoals.

33rd. *Data for Estimate.*—In estimating the cost of clearing the obstructions, so as to obtain a depth of 1 foot 9 inches to 2 feet over the shoals and rock ledges,—the only work that will be required to be be done to the shoals to obtain the above depth, will be to confine the stream to one channel, about sixty feet in width, which can easily be

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done with only gravel, and the earth from the banks. Twenty rupees will, on an average, be found an ample allowance for each shoal. Through the rock ledges a passage twelve feet in length, by two feet in depth will be sufficient; and as the depth of the rock to be removed will seldom exceed one foot, I reckon on an average two rupees per running foot as more than enough for the purpose. For the "Jappa Embly" and "Hirron Phal obstruction" I have allowed ten rupees per running foot, besides an additional sum of Rs. 1000 for turning off the water.

34th. *Abstract Estimate.*—The cost of executing the whole of the works, so as to remove all the obstructions on the Taptee, and to open navigation in the first place for a distance of over 232 miles, will be as follows:—

1st Division - - - - -	Rs. 580
2nd do. - - - - -	- 1,500
3rd do. - - - - -	- 900
4th do. - - - - -	- 2,500
5th do. - - - - -	- 4,000
6th do. - - - - -	17,300
7th do. - - - - -	- 6,660
8th do. - - - - -	- 2,000
9th do. - - - - -	- 140
10th do. - - - - -	- 7,000
11th do. - - - - -	- 260
	Rs. 42,840
Contingencies and Extra Establishment at 25 per cent. - - - - -	- 10,710
Total - - -	Rs. 53,550

The above does not of course include the cost of superintendence.

35th. *Annual Outlay, &c.*—I believe the following will be found an ample annual allowance for keeping open and improving the navigation, confining the water periodically at the gravel shoals—

Clearing away the bolders that may be thrown into the channels, and stopping up the extra channels that may be opened in the rains - - - -	Rs. 3,500
Havildars, naiks and peons - - -	3,000
Total annual outlay - -	Rs. 6,500

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36th. *Description of boats proposed to be used.*—The kind of boats that I would recommend to be at first used should be 96 feet in length, 8 feet wide by 2 feet deep, with perfectly flat bottoms, vertical sides, and rectangular ends—the bottoms to commence to taper up at 8 feet from both ends, like a shovel, so as not to present any obstacle to its easily gliding over the water. The bottom and sides to be of 1½-inch plank, running longitudinally. The ribs to be of plank 1½ inches thick, by 8 inches wide, running transversely, and spaced 8 inches apart; the planking and ribs to be securely and well rivetted together. A keelson, 6 inches by 4 inches, to run the whole length of the boat. A gunwale, 6 inches by 2½ at the sides and ends: eleven beams across the top of the boat to be firmly secured to the gunwale; and a beam, 6 inches by 4, to run the whole length of the boat under the transverse beams, and to be supported by eleven stanchions from the keelson. The above description of boats could be built at Koonkurmoonda, where wood is cheap and plentiful, for Rs. 500 each.

37th. *Available tonnage of boat for freight.*—I roughly calculate on 43,648 pounds as the weight of water displaced by the boat with a draught of one foot; and by deducting 14,620 pounds as the weight of the boat, the men and the stores for one month leaves 29,028 pounds, or nearly 13 tons, as the available capacity of the boat for cargo, at a draught of one foot only.

38th. *Cost for conveying one ton of goods.*—Supposing that each boat will be able to accomplish eight trips in the season, which I have no doubt can be done when the men get well acquainted with their duties, and when it is considered that they have the force of the current in descending, and of the strong westerly winds in ascending, then we have—

Men's pay for twelve months - - -	Rs. 300
Interest on money in boat - - - -	50
For renewal and repair of boat - - -	100
Total of yearly expense - - -	Rs. 450

Therefore, as it has already been inferred that eight trips can be made in the season, and by taking down thirteen tons in each trip, 104 tons of goods will be conveyed in the year. The cost being Rs. 450 for 104

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tons, one ton will cost Rs. 4 . 5 . 5 or 3 . 5 . 8 pies per ton per mile. In the above calculation nothing has been taken into account for the profit of the return trips.

39th. *The trade of the different countries that would likely go down the Taptee.*—It is to be presumed, in the first place, that the whole trade of Khandeish will go down the Taptee, a great portion of that of Berar Oomrawutty, being only 130 miles distant, the trade from Bundelcund, passing through Hossungabad, and the whole of the traffic from Indore along the Agra road would be diverged down the Taptee to Surat.

40th. *Whether Coal from Hossungabad might not be taken down the Taptee.*—It is not at all improbable but that, at some future period, it might be found advantageous to send coals from the coal fields near Hossungabad, down the Taptee.

41st. *Necessary to have the assistance of a native draftsman to prepare the plans quickly.*—As my duties in the Cotton Department will not admit of giving my undivided attention to the preparation of the detailed plan, estimate, and report, I would beg to suggest, should Government be anxious for their early completion, that I might be allowed the assistance of a native draftsman from Bombay. Without one I cannot hold out any prospects at what time they will be furnished.

Superintendent's Office, Dhurrumgaum,
10th September, 1852.

ART. III.—*The Direct Acting Hygrometer.* By C. G. E. FORD, of the Madras Army. March, 1853.

IN bringing this New Hygrometer to the notice of the Geographical Society, I would beg to observe that, of the numerous descriptions of this class of instruments which have been devised, none has satisfied the requirements of science. Of the few still extant, the one considered to be, by general consent, the most perfect, Daniell's, may be so theoretically; nevertheless it is not found to be so in practice, and our ablest meteorologists have concurred in stamping it as a faulty instru-

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ment. Two other kinds had partial notice and employment at the period of their introduction, but these are now seldom met with. I refer to the burnished gold cup having a thermometer bulb in centre, and the exhausting syringe to which is attached a cylinder containing a thermometer and a slip of burnished gold. I am not acquainted with the construction of Regnault's "Hygromètre Condenseur", nor have I been able hitherto to gather any description of it; yet I should imagine it to be, from its name, a mediate instrument, similar to the three first adverted to,—that is to say, the temperature is given at two points by some medium, as the ether in Daniell's.

As just stated, the principle in the above three Hygrometers is, that the dewing temperature is obtained mediately,—the ether by evaporation causing the black bulb in Daniell's, and the burnished surfaces in the other two, to be sufficiently cooled to condense on them the humidity contained in the ambient air, while the thermometer is supposed by the same means to suffer a similar loss of caloric, and thus to mark the corresponding temperature at which the deposition of dew transpired. On this condition of identity of temperature the value of the instruments under notice solely depends. Meteorologists are disposed to deny the existence of such a condition, and some of our ablest enquirers pronounce Daniell's to be an imperfect instrument; and to this conclusion I have arrived from the following irregularity in its action, which I have not found remarked upon by other observers. When the white bulb of the instrument was plunged into a glass of frigorific mixture, the internal thermometer would descend, say 20°, and dew gradually deposit on the black bulb, but any agitation of the instrument would cause an instant depression of six or seven additional degrees, and a copious formation of dew would result. At first I inferred from this that the disturbance of the surface of the ether had induced a more speedy evaporation: still, if this had been the only cause of the anomaly, one would have expected that, if agitation of the instrument were enforced from the moment the cooling the white bulb commenced, the dew point would be the same as that shown when the instrument was in a state of quiescence, only brought about more rapidly. Such, however, was never the case, but invariably 4° or 5° lower, albeit the experiments were conducted with the least possible interval. I believe we must attribute this peculiarity chiefly to the

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feeble heat-conducting power of ether (and of fluids in general) giving rise to strata of various temperatures within the black bulb.

In the absence, therefore, of a hygrometric instrument on which implicit reliance could be reposed, it became a matter of great importance to introduce any which would possess freedom at least from the objections ascribable to, if not advantages in other respects over, its predecessors. After revolving the essentials for such an instrument frequently in my mind, and detecting in many contrivances faults as prominent as those in the instrument already alluded to, the one before you was devised. It is necessary to premise here that it is, in a manner incomplete, as the thermometer should have had a black bulb to shew the dew deposit more distinctly. Yet the principle will be equally well illustrated by the instrument in its present state. I had not a small black bulb thermometer available.

A description is barely needed. Its simplicity is very striking. Half of the bulb of a small thermometer is admitted to the interior of a pewter cup, while the other half projects externally in the air, a ring of cement surrounding the bulb, and rendering the cup at the place of perforation water-tight. When the instrument is required for use the cup is three-fourths filled with water, and some frigorific composition of nitre and sal-ammoniac introduced, the lid closed, and the contents agitated by the spindle. The half of the bulb being in contact with the cooling mixture the reading of the thermometer is speedily reduced, until the dew forms on the outer half—the temperature at that instant being recorded. If it be admitted that the thin film of glass of the portion of the bulb exposed to the air has the same temperature as the mercury, it is manifest that the temperature of the dewing point has been correctly indicated. If this admission be withheld, it is difficult to conceive how any thermometric readings can in strictness escape question.

The advantages of this construction, which I propose to call a "*Direct* Hygrometer," are, its small cost, about one-fifth of a Daniell's Hygrometer; the feasibility of employing thermometers scaled to one-tenths of degrees; the promptitude and facility with which it can be used; the small expense of using it; the little risk of breakage; and the undeniable character of the deductions. I am endeavouring to obviate one objection which this instrument, as now constructed, has in

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common with Daniell's and others—the necessity of removing the eye from bulb to scale of thermometer: and for the fulfilment of this end, I have sought the aid of Colonel Sykes, to procure, if practicable, thermometers with *flattened* black bulbs—one surface of which shall be a *perfect plane*,—my aim being to reflect thereon the thermometer scale by mirrors, and thus enable the observer to note the reading and deposition of dew at precisely the same moment. This arrangement would, I conceive, perfect the instrument.

In conclusion, I wish to say, that I shall feel particularly thankful if the members present would discuss the features of this instrument, and instruct their Secretary to be good enough to communicate the result to me.

C. G. E. FORD.

Nursingpore,
15th February, 1853.

ART. IV.—*Geological Report on the Bagulkot, and part of the adjoining Talooks of the Belgaum Collectorate.* By Lieutenant AYTOUN, of the Artillery.

No. 994 of 1853.

To the Secretary to the Geographical Society, Bombay.

SIR,—In continuation of my letter (No. 4465) dated 27th December last, I am directed by the Right Honorable the Governor in Council, to transmit to you copy of a further report drawn up by Lieutenant Aytoun, of the Artillery, now engaged on the Geological Survey of the Belgaum Collectorate, with an illustration of the geological formation of the districts hitherto examined.

2. Government has no objection to their being published, should the Society see fit to include them in their "Transactions."

I have the honor to be, Sir, your most obedient servant,

J. G. LUMSDEN, *Secretary to Government.*

BOMBAY CASTLE, 22*nd March*, 1853.

THE district to be described is the area included between the rivers Kistna and Mulpurba on the north, south and east, and a line drawn through Gulguleh, Kulludghee and Badamee on the West.

Its outline is nearly triangular, the two rivers forming the sides of a triangle, of which the line drawn through Kulludghee is the base.

In a north and south direction its greatest length is about fifty miles; east and west about forty-five.

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From the granitic basin of the Kistna at Beelgee on the north side, to the basin of the Mulpurba at Jalcahal on the south, where the granite re-appears, the whole of the district belongs to what the late Dr. J. G. Malcolmson termed the "Argillaceous Limestone Formation."

The sandstone, schists, and limestones composing this formation are here so altered by igneous agency as to render it probable that the granite, though nowhere visible on the surface within the area occupied by these rocks (except on the sandstone ranges which form the boundary of the formation on the north and south); extends below from one end to the other, and that these rocks are but a shell covering the Plutonic rock.

The district as far south as the parallel of Kutteegeeree (or about sixteen miles south of Kullndghee) is composed of parallel ranges of sandstone and conglomerate, separated by valleys in which limestone and schistose rocks are developed. These sandstone ranges trend in the direction of the dominant strike of all the rocks, from W.N.W. to E.S.E. The valleys are in general covered with black cotton soil, mixed up with which there is in many places a large amount of detritus of various rocks.

There are lines of dislocation and disturbance in a nearly N.N.E. direction, at right angles to the dominant strike of the strata, and connected with them are some striking phenomena which may in this place be alluded to.

1st. On these lines of disturbance narrow gorges, or gaps, have been formed through the hill ranges.

2nd. The course of the rivers and nullahs is much influenced by these lines; a river flowing in its normal direction to the east is deflected at right angles, and flows through, occasionally, gaps in two successive hill ranges.

3rd. The rocks exposed in many of the nullahs which follow these lines are more particularly disturbed and altered. The strata are deflected at right angles to their usual strike; the schistose rocks are often in a fragmentary state—forming a brecchia; and the limestones are so indurated and silicified, as to strike fire with steel.

These phenomena are the effects of an igneous agent acting at a period subsequent to that which elevated the rocks, and impressed them with their W.N.W. strike. I am inclined to think that they may

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be referred to the epoch of the Basaltic effusion, and that the disturbances are due to dykes of basalt underneath the locally affected rocks. The rivers being in flood during my stay in the district, I had not an opportunity of studying the best spots for the development of the igneous rock; nor at the gorges where the rivers have most probably laid bare the igneous agents: but at Bagulkot, where the Ghutpurba passes through a sandstone range, I observed basalt above the surface of the water. There is a brecchia composed of fragments of limestone and red schist in a base of calcspar at one place near Bagulkot—it passes into rhomhohedral calcspar rock, occupying a breadth of about twenty yards in an east and west direction. The direction of this dyke (if it may be so called) is N. E. by N. It will be described in detail when I come to notice the Limestone Valley of Bagulkot.

I do not consider this Brecchia as an igneous effusion, but that the breaking up of the rocks *in situ*, and a subsequent igneous or electro-galvanic agent has given rise to this singular product.

There is a brecchia at Kulludghee through which wells have been sunk to the depth of thirty feet. It is composed of fragments of quartz sandstone in a calcareo-argillaceous base. This, I am inclined to think, is the result of the breaking up of alternating bands of sandstone and schistose clay. The fragments are generally prismatic.

Wherever the sandstone becomes a quartrite it is, almost invariably, divided by planes longitudinally and transversely, occasionally in such number that the prisms are scarcely an inch across.

A slight convulsive movement would be sufficient to dislocate and disorder the upper beds of sandstone so divided; and accordingly there are few spots on any one of the parallel sandstone ranges where the strike dip or bedding are visible, owing to the accumulation of the prismatic fragments of the broken up beds.

The south part of the district is composed of a widely extended sandstone tract. It presents a precipitous front to the Black Plain of the Mulpurba, the bounding hills being from 250 to 300 feet high. Granite appears below the sandstone of these hills at Jalechol, and gneiss and felspar rocks extend across the Black Plain to the very foot of the Kuppulgood Hills. The trend of this sandstone tract approximates to that of the ranges to the north, taking the direction from Moorgoor as the point on the west, and Gudjunderghur as the eastern

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extremity, The trap deflects it to the north at Moorgoor, but it resumes its W.N.W. direction in the hills north of Belgaum, and onwards to the summit of the Ghauts. It is this sandstone which again appears in the Concan at Achre, Malwun and Motee (ten miles north of Vingorla), if an opinion may be formed from the general direction of the tract.

Adopting the views of Elie de Beaumont regarding the period of the elevation of mountain chains, this elevated tract would be referred to his Pyreneo-Appenine system, traces of which he is already said to have found in the chain of the Ghauts.

The infusion of iron into portions of all the stratified masses, which appears to have characterised one epoch of igneous activity, has given rise to an abundance of iron ore in most parts of this district; and associated with the iron (and most probably effused at the same period), there are ores of manganese. The beds of all the nullahs abound in titaniferous iron sand, and the black soil also contains it in large proportion. There are traces of copper in the limestone near Kulludghee.

The limestone at Bagulkot has been of manganese, but this metal is more frequently met with amongst the sandstone in veins of quartz. Specular iron is found in the same situation, but Hæmatite quartz iron ore and argillaceous iron ores are the more frequent varieties.

Iron has at one time been smelted very generally throughout the Talook, and the slay from the old furnaces may still be observed in different localities. The scarcity of firewood in the northern parts of the district, and the introduction of English iron, have been the causes of the extinction of this manufacture. A few furnaces still exist in the southern part of the district, where there is more jungle on the hills. The ore selected for smelting is a very poor iron clay, and the iron produced from it is of inferior quality.

In the localities where the iron ores most abound Laterite makes its appearance. On an elevated tract between Bagulkot and Kulludghee there are ridges of this rock, stratified and jointed, and following the same strike as the other rocks of the district. It is interstratified with sandstone and clays, and is in my opinion the clay of the locality with an infusion of iron, subsequent oxygenation having produced its present form.

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The black soil of the valleys is frequently underlaid by a stratum of lateratic gravel, the detritus of ridges, perhaps, similar to those just mentioned, which diluvial action has worn down. This gravel may sometimes be seen concreted into a firm mass, and all trace of its conglomerate structure becoming obliterated, from one pebble being as it were fused with the other.

The junction of the Great Basaltic district with the Granite of the Basin of the Kistna, occurs about three miles north-west of Beelgee. The gneiss and hornblende schists are much decomposed near the junction.

The trap passes below the just Sandstone Range on the north, and appears in the valley beyond, alternating with undulations of sandstone.

The nodular and prismatic varieties of basalt are the most common; it is occasionally slightly amygdaloidal.

The black soil has not all been deposited into a quiescent state. It may occasionally be seen alternating with thin layers of fine gravel, as if there had been an intermittent action, a stronger current prevailing at one time than at another. It is also frequently mixed with rolled fragments of iron on quartz and other rocks, and on being washed yields a fine quartrose sand, and a large quantity of titaniferous iron sand, a basket of which contained fifty pounds of soil, and was taken from a field far above the present drainage of the country, yielded—

Fine quartrose sand and gravel (iron ore, quartz, &c.) the pebbles rounded, and about ¼ to ½ inch in diameter	2¼ lbs.
Titaniferous sand - - - - -	3¼ „

Another basketfull yielded as much as eight pounds of gravel, and a proportionate quantity of iron sand. Even when no pebbles are visible in the soil I have found, on washing it, that they often abound.

The black soil does not appear to be of great depth in this district; it is often locally distributed about Kulludghee, where limestones and the bed of diluvium (which appears every where to underlie the black soil) appear on the surface. This is also the case about Bagulkot, until we penetrate to the valley of the Kistna, where a great depth of soil prevails.

The gravel bed below the soil will prove an useful auxiliary to the

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Engineer, when, in the progress of improvement, roads shall be constructed across the black soil plains. I have observed in many of the black plains of the Southern Mahratta country, that the country roads are often along the beds of nullahs, which are selected on account of the hard gravelly bed exposed by the washing away of the soil.

I now proceed to describe in detail the several Sandstone Ranges, with their intervening valleys, commencing in the north, near Beelgee.

FIRST SANDSTONE RANGE.

The strip of land beween the Kistna and the first Sandstone Range is composed of granite, gneiss, and hornblende schist (the felspar and hornblende being in separate laminæ); the latter two rocks are in a decomposed state about half a mile from Beelgee.

The first Sandstone Range extends from Beelgee to Gulguleh in a slightly curvilinear direction, very nearly approaching a line W.N.W. and E. S. E. At Beelgee it makes a bend to the southward, and here strata are a good deal thrown about, and the hills project in short headlands with ravines between them. The granite is well developed in these ravines, and is also visible about sixty or eighty feet up the hill, intruding on grits and conglomerates, which then form the lower beds of the sandstone.

A red porphyritic felspar rock of prismatic structure, but much decomposed, is seen at one point about sixty feet above the base of the hill. There is also here a rock composed of red felspar and translucent (and sometimes transparent) quartz, which much resembles red Egyptian porphyry. Some varieties of it, when seen in blocks which have been slightly rounded, look much like a conglomerate, from the large fragments of quartz in them, but on being broken they have not the appearance of a mechanical origin.

Some of the beds of sandstone about Belgaum, of a highly crystalline character, have been, I think, derived from the abrasion of rocks like those above mentioned; and they are probably the ancient rocks of the district which have furnished materials for the lower beds of sandstone. I was at one time doubtful as to their origin, but having met with highly crystallised compounds I now regard them as Plutonic rocks.

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The height of the first Sandstone Range, above the black soil plain of the Kistna, was ascertained by the aneroid barometer to be 200 feet. The thickness of the different rocks composing the hill behind Beelgee is as follows—commencing at the top:

1.	Quartrose sandstone, in beds 18 inches thick, white and reddish - - - - -	80 feet.
2.	Grits and conglomerates - - - -	40 „
3.	Granite and felspar rocks - - - -	80 „

The sides of some of the headlands have a terraced aspect, from the beds of sandstone projecting one beyond the other. The sandstone is not divided, as in other ranges, by innumerable divisional planes. It forms a good building stone, and is quarried with great facility. About three miles from Beelgee a soft variety is largely quarried for hand-mill stones.

On the summit, where the sandstone is hardest, and most nearly approaches to quartz rock, there are a few joints W. N. W. in the direction of the range. The dip of the beds is at a gentle angle (10°) to the south.

About three miles from Beelgee, on the road to Gulguleh, the trap of the Great Basaltic district makes its appearance in low hills, extending apparently from the Sandstone Range to the bed of the Kistna, and most probably crossing the bed of this river. In a south direction this offset of the Basaltic District is met with in the valley between the first and second Sandstone Ranges, where it penetrates to the borders of the schists and limestone, both of which it has broken up. Westward it continues to Gulguleh, when I observed it breaking in on the sandstone; and in the bed of the river near Gulguleh the river is probably crossed by trap dykes; but I had not an opportunity of verifying this, owing to the river being in flood. I observed, however, a rapid which indicated the existence of rocks below the surface, and the very name Gulguleh, which is applied to the village on either side of the river, probably owes its origin to the sound of water rushing between rocks. The effect of an igneous agent acting more or less in a north and south direction, transverse to the natural drainage of the country, would be, that dams or lakes would be formed, and these would exist only until the water flowing over the dam-head cut its way backwards through the dyke, when the dam or lake would be

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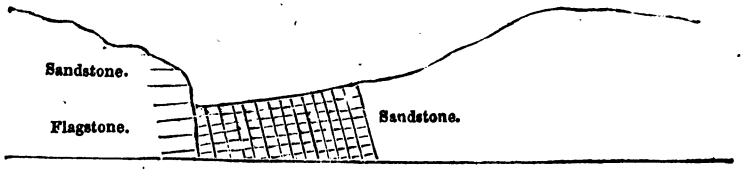
emptied. That an obstruction of this kind formerly existed near Gulguleh is extremely probable ; nor has it even now been altogether removed, if we may form an opinion from the breadth of land overflowed when the river is in flood. There are two varieties of trap rock in this part of the district—the prismatic and the spheroidal, both so common in the Great Basaltic district.

From Gulguleh I crossed the first Sandstone Range at its western extremity. A fault exposes a dark greenish thick bedded flagstone, which is cut up by divisional planes on the east side.

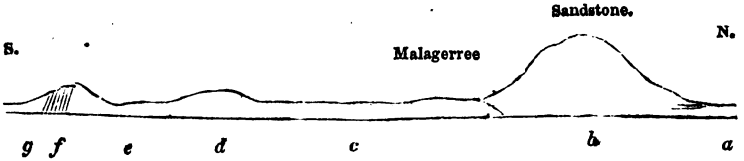


This species of flagstone has been much employed by the Jains in their temples. It is not exposed in other parts of the district, that I am aware of.

The valley which lies between the first and second Sandstone Ranges is, on the east towards the river, covered with a great depth of black cotton soil, and no sections are exposed. But on the road between Kulludghee and Beelgee the black soil only occupies a narrow strip near the north side of the second Sandstone Range, while the rest of the valley to the foot of the first Sandstone Range is covered with a very sandy soil, the debris of the rocks which underlie it.

More to the westward, between Kulludghee and Gulguleh, trap alternates with sandstone ridges for several miles.

Section from Gulguleh to where the Trap meets with the Schists and Limestone.



a. Trap near Gulguleh.
b. First sandstone range.
c. Trap at Malagerree.
d. Sandstone undulation
e. Trap.
f. Low sandstone range much veined with quartz. Beds dip 70° south on the top ; nearly vertical at the bottom, and thrown about.
g. Limestones and schists ; the latter brecchiated by the agency of the trap.

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At Malagerree the beds of sandstone are broken up into small prisms, which completely cover this side of the hill, and conceal the direction and dip of the strata. This effect has doubtless been produced by the trap, which is seen in the section emerging from both sides of the hill, and which, it may be safely concluded, passes below these broken up beds.

SECOND SANDSTONE RANGE.

This range is about 180 feet high. It is composed of sandstone and conglomerate, the former containing a good deal of felspar, the latter having jaspideous schist and quartz imbedded in a firm silicious base. On the south side the sandstone is almost a quartz rock; it is broken up into fragments which conceal all the beds. The direction and dip of the strata were nowhere exposed at any of the points I visited. This fragmentary state of the sandstone beds is common to all the intermediate ranges between the first range at Beelgee and the great Sandstone tract on the south, at Badamee.

Were it not for the sections exposed at the different gorges where the rivers and nullahs find a passage from one valley to another, the observer would be left in the dark as to the relative positions of the sandstone of the hills and the schists of the plains.

It is not improbable that the gorge through which the river Ghutpurba passes at Yerkul may afford a section exposing the relative positions of the rocks composing this range; and in this hope I visited the hills at Yerkul, but I was unable to complete my examination of the gorge on my first visit; and, owing to my health failing me, I never obtained another opportunity of re-visiting Yerkul.

At its eastern extremity this range bends away at right angles—to the north-east; I did not examine the hills in that direction, having left the district before I could accomplish this object. To the west of Yerkul this range is continuous for eight miles only, it is then interrupted for several miles; but small ranges, prolongations of this, are met with to the north of Kulludghee on the Beejapoor road. In a narrow valley on that line greenstone of a homogeneous texture is met with, intercalated among the limestone and indurated schists.

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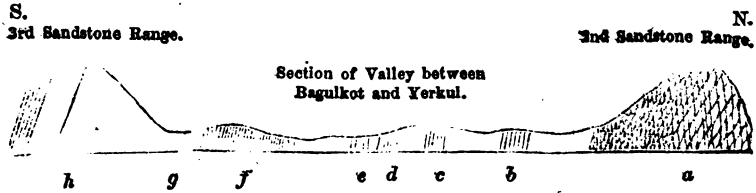
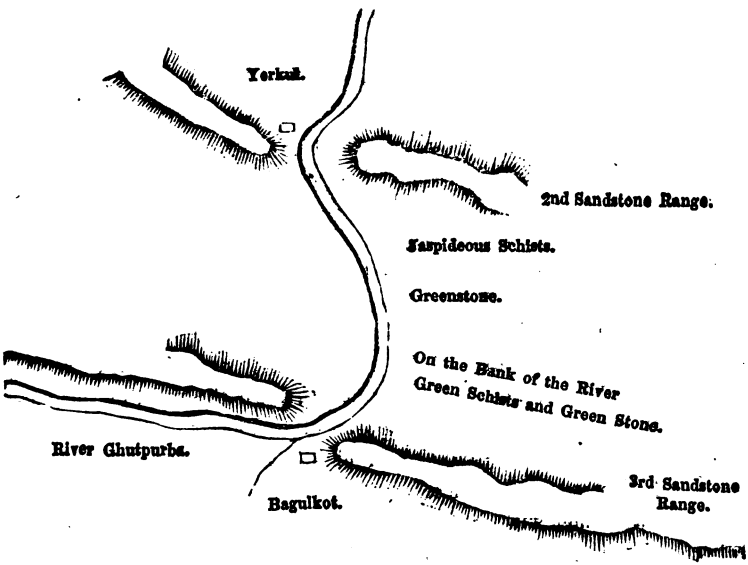
Between Yerkul and Bagulkot the rocks exposed in the valley on the right bank of the Ghutpurba, are shown in the section below :—



a. Second sandstone range, south side covered with debris of the beds.
b. Indurated ferruginous schist.
c. Greenstone, both crystalline and almost homogeneous.
d. Green schists.
e. Greenstone crystalline with a schistose structure.
f. Green schists.
g. Crystalline greenstone—slaty cleavage.
h. Third sandstone range—sandstone alternating with schistose clays.

It is in this valley that the Ghutpurba makes one of those striking aberrations from its natural course which have already been alluded to. The subjoined sketch will best illustrate this :



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The crystalline greenstone, of which there is a great development in the valley to the right of the river, has not, I think, had any part in forming the gorges through the hills. It is intercalated apparently among the schists, and it is itself schistose in structure; but a dark basaltic trap, seen on the bed of the river, has most probably been the agent in the formation of the gaps through these hill ranges. The nullah which joins the Ghutpurba from the south also passes through gaps in two sandstone ranges to the south, before it enters the valley of the Ghutpurba at Bagulkot; and these gaps are nearly on a line with the two through which the river has been shown to pass.

THIRD SANDSTONE RANGE.

On the left of the gorge at Bagulkot the hill is composed of a jasper-conglomerate and a quartrose sandstone, having here and there circular spots of a different hue from the base. These spots I take to be pebbles, which have retained their colour, although in texture they have been assimilated to the matrix. Conglomerates are not unfrequently fused into quartz rock in many metamorphic districts; and this quartz sandstone is a very near approach to a compact quartz rock, and very often passes into it.

The beds of the quartz sandstone are here broken up, and at only one point did I observe an appearance of bedding. Where rocks are cut up by numerous divisional planes, it is only by their relation to rocks of a different composition that their bedding can safely be decided; and here the jasper-conglomerate on the north side of the hill was the only rock to guide me. Judging by this, and by the dip of the rocks on the opposite side of the gorge, I determined the strike to be W. N. W., dip 40° south.

This accords with the dip of the limestone in the valley, and with the schists and sandstone of the next range, where a clear section places the bedding there beyond all doubt. On the right of the gorge a hill with a temple on it is composed of a fine laminated clay, of a whitish colour—not unlike Kaolin clay, which is excavated by the natives for whitewashing, &c.

This clay is met with on the summit of the hill; but to the eastward, where the range attains a greater elevation, a schistose clay—probably

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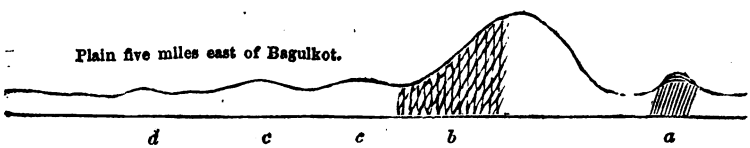
the equivalent of this—is found overlaid with quartz sandstone, which dips south at an angle of 27°. On the north side the strata are so thrown about and dislocated, as to defy any attempt to lay them down on paper. There is a good deal of a conglomerate composed of quartz pebbles in a ferrugine-silicious paste, lying about in blocks on Temple-hill. It resembles the diamond conglomerate of the south of India. In the ranges to the south of this a similar conglomerate is not unfrequently met with.

More to the eastward, about five miles from Bagulkot, I crossed this range to Munneekuttee, where the following section was obtained:—

S. N.



a. Ferruginated schists, with much quartz and iron ore.
b. Sandstone beds broken up into prisms, ½-inch to 4 inches across.
c c. Laterite ridges, with a great deal of their detritus lying about.
d. Sandstone detritus.

At this point there has been an effusion of iron, evidenced on the north side by the ferrugination of quartrose schists, and on the south side by the laterite. But not only is the iron effusion apparent in the rocks on either side of the hill, for on the hill itself the sandstone may be observed in different stages of ferrugination up to a rich granular quartz iron ore; and that the sandstone has not originally, on its deposition, contained this iron, is proved by the fact of the ore being still unoxidised.

About ten miles from Bagulkot, on a prolongation of this range, there are low sandstone hills, with veins of quartz containing specular iron. This sandstone here has a red tinge, and is more granular than that at Bagulkot; the beds are not so much broken up, and the stone is employed in buildings.

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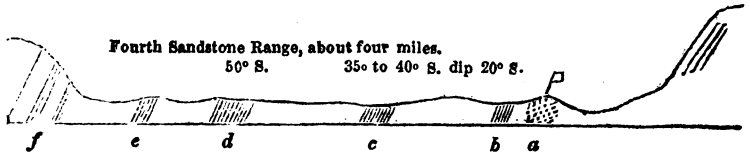
S. *Limestone Valley of Bagulkot.* N.



a. Ridge of schist and quartz brecchia.
b. Granular limestone.
c. Compact limestone with chlorite slakes.
d. Lithographic limestone alternating with white limestone, colored with chlorite in part, and schistose limestone passing into clay schist.
f. Sandstone ridge, composed of sandstone alternating with schist.

The ridge *a*, seen in the section, on which the fort and town of Bagulkot are situated, is about fifty or sixty feet above the level of the river Ghutpurba, which washes its base.

In a well I observed a section showing a brecchia of schistose clays and fragments of quartz sandstone; and this brecchia probably constitutes the greater portion of this ridge; but at its western extremity it shows large blocks, *in situ*, of a very beautiful rock. Some of the blocks are entirely composed of brilliant crystals of quartz and hæmatite; other blocks are found to be a brecchia of angular fragments of sandstone cemented with hæmatite, and this latter sometimes so predominates as to produce large blocks of iron ore. Crystals of quartz ore are imbedded in the body of the hæmatite in a singular manner. I believe that in a rock having these characters, and occupying the same geological position, diamonds and several other gems are occasionally met with in the diamond districts of the south of India.

As I shall afterwards explain, I do not suppose the brecchias in this district to be all volcanic effusions, most of them having resulted, in my opinion, from Plutonic disturbance, which has disordered and jumbled up the alternating strata of sandstone and schists.

At the East Gate of the fort of Bagulkot an impure limestone is seen in a nullah, dipping south at an angle of about 15° or 20°. To the south of this, again, schistose clay is exposed: but the succession of strata is not clear here, owing to the covering of detritus and black soil; and, owing to the same cause, it is only occasionally that the

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rocks present themselves above this superficial covering throughout the valley, so as to admit of their dip and direction being noted. In the nullahs which cross the plain in a north and south direction they are better exposed than in other places; but, as I have already mentioned, there are lines of disturbance where the rocks are more highly altered than in other places, and to generalise from the phenomena presented by these, would be to lead to erroneous conclusions.

I have given in the section what appeared to be the dip of the rocks which had been least affected by local disturbance. On the same strike I had found the limestone and schists dipping at the angles given, and also nearly vertical, or with the bedding so obliterated as to appear to be vertical.

In so disturbed a district it is not perhaps of much consequence to fix the dip, unless for the purpose of ascertaining where an anticlinal axis exists, or where the strata are folded over. My observations at Bagulkot did not detect either one or the other of these mechanical effects of a Plutonic agent, although at Kulludghee there is some reason to believe that such may have occurred. The limestones near the parallel of Bagulkot are either impure granular limestone, or a slaty marble of a compact texture, with thin plates and colored veining of chlorite, and occasionally talc.

In a nullah south of the Fort the limestone has a gnarled and twisted appearance, like some varieties of gneiss. It there loses all trace of bedding. The contorted appearance of this rock is due, I think, to bands of an argillaceous character, which have, on the heating process to which this rock has been subjected, assumed a wavy outline.

Near the Fourth Sandstone Range the limestone is much purer than in other places in this valley. One variety, of a very pale colour, breaks with a fine conchoidal fracture, and has the texture of lithographic limestone—it alternates with a white limestone.

On polishing pieces of the lithographic limestone which appeared perfectly free from foreign ingredients, the small silicious spots which have frequently been noticed as a great defect in this stone became apparent. In hand specimens some of the white limestone is a pure crystalline marble, which might be pronounced statuary marble; but I never found that the bed from which the specimens were taken continued pure for any distance.

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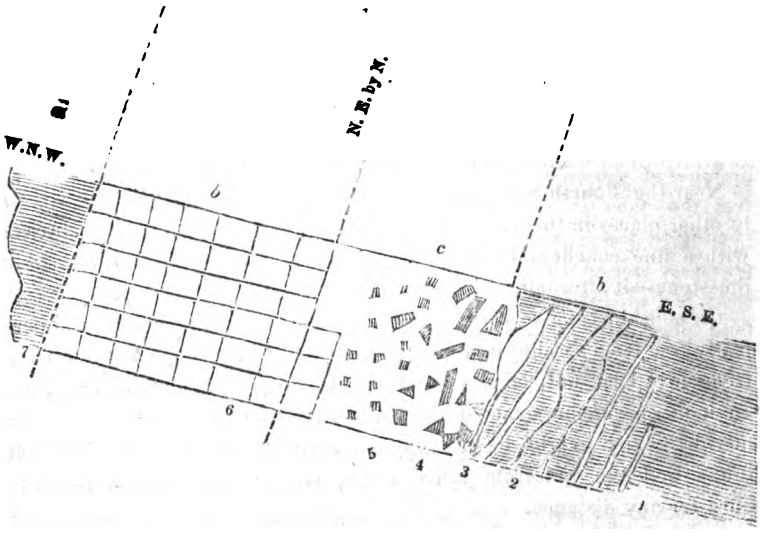
Between Bagulkot and Seroor a pink or salmon-colored limestone is met with on nearly the same strike as the rocks I have just been describing. The same variety of limestone is rarely met with on the same line of strike; and this is doubtless due to the many alterations which the beds have undergone, the metamorphising agent acting transversely to the strike.

CALCSPAR BRECCHIA.

Near the village of Guddunkeeree there is a brecchia deserving special notice. I have termed it Calcspar Brecchia; but it is composed of schists and limestones of all sizes in a base of calcspar. The limestone on the surface at this point is principally a banded rock, buff and blue limestone alternating; it is nearly vertical. There are other limestones besides this one, but it appears to be divided most clearly by the brecchiated rock which I am about to describe. The following ground plan of the rocks at this place exhibits the strike of the limestone cut through by the brecchia, and the direction of the fissure occupied by the latter.



a. Limestone. *b.* Rhombohedral Calcspar. *c.* Calcspar Brecchia.

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1. Limestone in alternate blue and buff bands, each about two inches thick.
2. Strings of calcspar veining the limestone in a N. E. by N. direction.
3. Thick veins of calcspar, irregular in direction.
4. Brecchia of limestone with calcspar base.
5. Ditto, with the calcspar in excess.
6. Rombohedral calcspar rock, not less than twenty yards broad.
7. Continuation of limestone.

The limestone on the east side is at first seen to be fissured N. E. by N., and the fissures, which do not exceed a quarter of an inch in breadth, are filled with calcspar strings : still further west these strings of calcspar increase in size, and become thick veins, but still with the limestone rock predominating; these veins, however, send branches off in all directions, and pieces of the limestone are isolated as it were in calcspar. More to the west the fragments of limestone and also schist are confusedly thrown about in a matrix of calcspar, and these fragments decrease in number until the rock ultimately becomes pure calcspar. The calcspar rock is covered with several feet of fine alluvial soil, and does not appear on the surface as the brecchia does. As the stone is used by the natives for sprinkling on days of festivity, to break the monotony of the hue given by the cow-dung, and to produce a glittering effect, two small excavations had been made in the field for the purpose of extracting the mineral.

With the view of ascertaining whether lead or other metals, which are often associated with calcspar in veins, existed here, I employed men to increase the size of the excavations in an east and west direction, as I thought that if metals did exist some indications would be found at the junction of the calcspar with the other rocks. For upwards of fifteen feet the calcspar was laid bare at one of the excavations without coming to the termination of that rock; and, from observations made on either side of this, I do not think there can be a less breadth than sixty feet of this dyke. A growing crop of grain in other parts of the field prevented further investigation. How far the calcspar dyke extends lengthways is not apparent; but two hundred yards to the north the valley is bounded by a sandstone range, and here probably the limestone terminates.

Underneath the soil and overlying the calcspar rock there was at one point a bed of conglomerate Kunkur, not the nodular variety which is so common under the black soil, but *sheet Kunkur*, which is met with in

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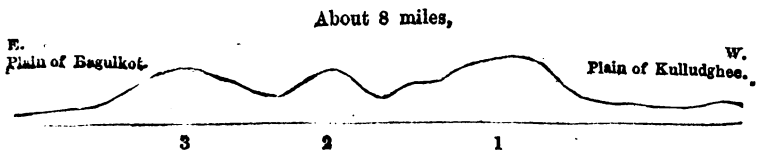
a great many parts of the Southern Mahratta country, and which appears to have been deposited immediately anterior to the formation of the black soil. In a cavity of the calcspar there were rolled pebbles, and diluvial action was otherwise apparent in the denudation of the calcspar, and in rolled pebbles in the lower parts of the alluvial soil.

In the rocks (limestone) to the east of Guddunkeeree rows of holes may be observed on the upper surfaces of the more massive kinds, which have lost their bedding. I was at a loss to conceive the origin of these until I met with one hole still retaining a concretion of calcspar. All of these cavities have at one time been filled with calcspar which has since decayed. One of the holes is sufficiently large to form a small tank during the rains, and along its edge may be observed two rows of small cavities with their diameters varying from half an inch to two inches.

The Limestone valley of the Bagulkot is not continuous with that at Kulludghee, although they are on the same parallel, and this is owing to a cross elevation of sandstone and schists.

Before passing to the Kulludghee valley it may be as well to describe this elevated tract—the only one in the whole district, that I know of, where laterite is well developed, and where its relations to the other rocks are clearest.



1. Sandstone, blue schist, slate, quartz, iron ore, manganese and laterite.
2. Sandstone, laterite, great quantities of iron ore and manganese.
3. Sandstone, slate and schists, nearly vertical east and west.

The above section is intended to represent the undulations passed over in crossing from Bagulkot to Kulludghee. Nearly the whole of this tract abounds in iron and manganese ores, never seen in veins *in situ*, but covering large spaces from broken up veins. The laterite appears here in ridges in a direction west by north, which is also very nearly the direction of the slate and schist, and of the sandstone hills.

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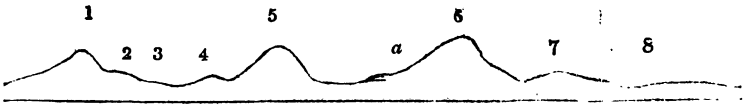
The section I am about to give is not at right angles exactly, being in a N. N. W. direction; but it is transverse, and embraces the whole elevated mass.



1. Cromlech hill composed of sandstone and blue schist.
2. Ridge of laterite W. by N., jointed in blocks between 2 and 3, there is a deal of laterite detritus, followed by blue schistose clay and quartz with iron ore.
3. Laterite ridge jointed in blocks.
4. Blue schistose clay W. by N.
5. Sandstone and conglomerate hill.
a. A ridge of laterite W. by N. The rest of the valley is covered with detritus of sandstone and soil.
6. Sandstone hill.
7. Laterite ridge W. by N, jointed like all the others.
8. Blue schistose clay and quartz with iron ore.

The original components of the whole of this tract have been the sandstone and the blue clay. The Plutonic agent which elevated the tract infused iron into the clay, which oxidising has produced the laterite; the sandstone has been turned into quartz and into quartz iron ore. Such was my interpretation of the phenomena after a careful examination of this very confused tract.

The blue clay may be well studied at the section of Cromlech-hill, where the river Ghutpurba infringes on its western side, and is deflected to the north. Here in one place it has an almost massive appearance, and again in another it is finely schistose, while the laterite ridge at the foot of the hill shews it in another form with an infusion of iron.

The upper part of this hill is composed of quartz sandstone, cut up as usual by innumerable planes, and covered by prismatic fragments of a few inches diameter, resulting from an upheaval of the beds. The prisms are so small that even the rude architects of the cromlechs and circles of stones which are found on the top of this hill, have been compelled to resort to the laterite ridge between, for materials to form the circles, and to the valley of Kulludghee for large blocks of limestone with which to construct the cromlechs.

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This tract has its ranges of sandstone following the dominant direction; but at its western end, where the edges are presented to the valley of Kulludghee, the schists and limestone forming the valley are seen near the foot of the hills with a strike at right angles, and the rocks do not recover from this deflection for upwards of half a mile from this range or elevated mass of rocks.

Returning to the Bagulkot side of this elevated tract a low range of hills, nearly on a line of strike coincident with that of one of the hills forming the tract, lies immediately to the south of Bakulkot. The sides of this range are every where covered with the prismatic debris of the broken up beds of quartz sandstone, of which this range is principally composed.

But at one point, nearly in the same line with the gaps in the two ranges to the north, through which the Ghutpurba flows, there is a narrow gorge in this range through which a nullah finds its way to join the river at Bagulkot, and at this gorge there is a clear section of the hill exposed. The bursting of a bund which formerly dammed the valley beyond, has swept away all debris which could obscure the bedding, and a section—the clearest in the whole district—and one which places beyond all doubt the intercalation of the schists with the quartz sandstone is obtained.

I consider the determination of this fact as important, because from the obscurity caused by the breaking up of the beds of this sandstone, and from its superior position to the other rocks, Captain Newbold and Dr. Chrystie (who have published passing observations on this district,) both seem to have thought that this sandstone was unconformable to the schists, and rested upon them. Had such been the case this formation would have differed from the other argillaceous limestone districts in India, where, although the sandstone is superior to the schists and limestones in the statigraphical position, the whole are conformable.

It was after the examination of this section that I came to the conclusion that many of the apparently volcanic brecchias were merely the effects of the then alternating beds of schists and sandstone being jumbled together *in situ*; for it will be observed that in the section on the next page sandstone in thin bands an inch or two in thickness at one point alternate with the schist or schistose clay. As these bands of sandstone are subdivided into rhombs, the mechanical effect of a

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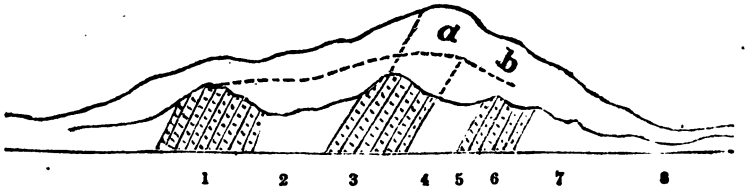
convulsive movement would be sufficient to dislocate and disorder the mass, and to mix the sandstone fragments up with the clay; and it is this cause, I think, which has produced the confused mass of clay and sandstone, through which wells have been sunk to a considerable depth at Kulludghee.

Section showing the Quartz-Sandstone alternating with Schistose Clay, about three miles south of Bagulkot.



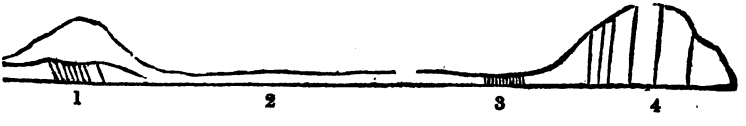
a. The beds are prolonged to near the summit.
b. Debris of sandstone fragments, 10 feet thick.

1. Sandstone, cut up by innumerable divisional planes.
2. Schistose clay 18 feet thick.
3. Sandstone 18 feet thick, cut up by divisional planes.
4. Schistose clay, 8 feet.
5. Thin bands of sandstone alternating with schistose clay.
6. Sandstone cut by vertical planes and by others, 25° N. dip.
7. Schistose clay, ragged in appearance.
8. Limestone valley of Bagulkot.

Height of hill about 70 feet; the fragments of sandstone form a mass eight or ten feet thick over the rocks, as seen in the section exposed by the bursting of the bund.

The valley beyond this hill is covered with soil through which debris of iron schists, iron and manganese ores, and quartz are profusely scattered.

N. S



1. Hill just described.
2. Valley covered with detritus of soil, &c.
3. Fine red glossy schists.
4. Sandstone Range beds, dip S. at 80°. This hill is profusely veined with quartz in an east and west direction.

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Another gorge is met with in this west range, in the same line as the last gorge, which had formerly been artificially bunded. I was informed that on this Sandstone Range there were two of these gorges, and that both were formerly barred by artificial means, but that floods had swept them away.

These gorges have played a most important part in the former agriculture of the country, and it is singular to find the natural drainage of the parallel valleys running at right angles to the bounding hills, so as to admit of this artificial damming. Beyond this range the sandstone appears in one or two ridges about sixty feet high; towards Kuttergerree they are all cut up by divisional planes, and have debris on their sides. The limit of the schists and limestones I have marked about three miles south of that village. The limestone, in the form of a fine schistose variety, is met with at the nullahs which in the map may be observed a little to the south of the village. The schist appears in several places nearer Badamee for a few miles. This part of the country is very much covered with black soil, which, however, terminates a mile beyond the limit of the schists, and we then enter the great Sandstone Tract of Badamee.

On the borders of the black soil a detritus of jasper quartz and other pebbles is met with.

The hills at Badamee attain a height exceeding any of those that I have described, being upwards of 250 to 300 feet high; (I judge by comparison, for during my stay here the weather was so rainy that I could not use the aneroid barometer.)

At the several points where I examined the sandstones at Badamee and Jaleehul the bedding appeared to have been destroyed. There were cracks nearly horizontal, and others crossing them; but both appeared to me to be too irregular for true basis of deposition, and in a quarry on the top of the range at Jaleehul, where these lines were observed, there was also a part of the sandstone having a distinctly schistose character, and dipping at a high angle, thus:

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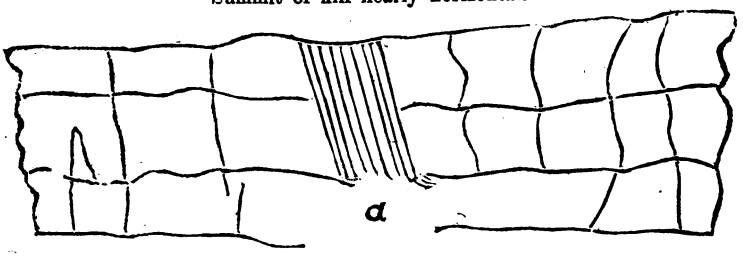
Summit of hill nearly horizontal.



The above may represent one side of the quarry, where I observed the appearance mentioned above: *a* is the band of a schistose structure where all around was massive, nor was this band visible beyond one side of the quarry.

From the above circumstance, and from the appearance of eurite (granite) and felspar rocks below, I concluded that the original lines of deposition had been obliterated and new lines marked by the action of the igneous agent. A river has apparently washed the base of the Badamee hills, where there is a considerable depth of fine sand, similar to what a river would deposit near the hills which it was wearing away. The Ghutpurba at Kulludghee is now throwing up banks of fine quartrose sand close to where it impinges on Cromlech-hill.

There is much more felspar in the composition of the sandstone from Jalechul to Kuttergeeree than in the sandstones met with to the north. South-East of Bagulkot, at Serroor, the beds of sandstone and conglomerate have a good deal of schist in their composition, and the fragments when numerous give a schistose structure to the conglomerates; and at Kutteegeeree, the ranges of quartrite there have a cellular appearance, from the decay of the felspar on the exposed surfaces.

At Badamee the hills appear to be entirely composed of sandstone, and there being nowhere else so great a thickness of this rock to the north, this cannot be a repetition of the sandstone met with in the hill ranges. It may be that (as the dip appears to be south in the district occupied by the limestones schists and parallel hill ranges) this tract is composed of the upper beds of sandstone of the same formation, the lower beds being the schists, &c. to the north.

The weather was so rainy when I passed through Badamee that I

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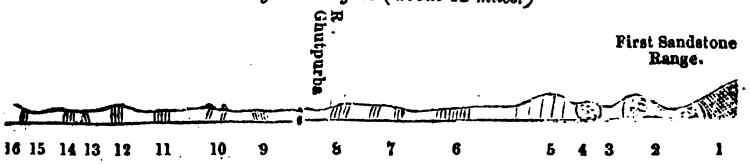
had no opportunity of examining the neighbourhood in detail, and I have introduced this track in order that the district from the granite on the north to the granite on the south may be considered as a whole. My examination merely enables me to give its general features. At Moorgoor, however, I must not omit to mention that the hill consists of conglomerate (pudding-stone of large quartz pebbles in a ferrugine argillaceous base) on the top beds of sandstone immediately below, and clays near the base. There is a sandstone near the top of a friable nature, almost entirely composed of red felspathic granites. A variety of this is, I believe, quarried in the same range at Pursghur, for stones used in grinding sandal-wood. Greenstone porphyry has penetrated to the summit of the sandstone hills north-west of Moorgoor, and appears as a centre nucleus.

VALLEY OF KULLUDGHEE.

The rocks in this valley, which is on the parallel of the Bagulkot one, are extremely confused, and the sections transverse to the dormant strike show that the different stratified masses have been brought to the surface in the most irregular manner within very limited localities. I will begin by giving a section from the First Sandstone Range on the north to the Range south of Kulludghee.

Plain of Kulludghee (about 12 miles.)



1. Range composed of sandstone.
2. Trap, principally spheroidal, like that in basaltic district.
3. Undulation of sandstone broken up.
4. Trap.
5. Limestone, dip southerly.
6. Limestone and schists, much disturbed.
7. Argillite beds yielding honestones.
8. Limestone bedding, much obliterated.
9. Thin bedded flagstones and shales, dip north.
10. Limestone and slate, dip south.
11. Limestone and schists much broken up; bedding obliterated in most places, often very cherty.
12. Ditto.
13. Limestone, whitened and silicified.
14. Flagstones similar to 9.
15. Schistose clay below sandstone of the hill.
16. Range of sandstone.

Where the trap approaches the limestone the rocks are much broken up on lines N. N. E. The sandstone ridges are veined with quartz

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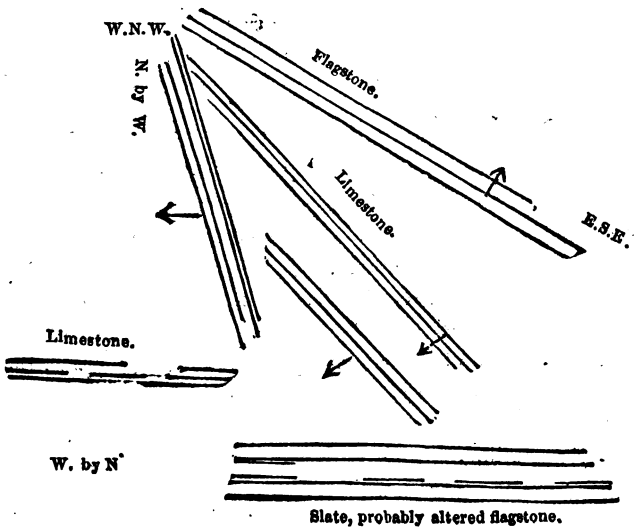
parallel to the strike. At the village of Katurke, about three miles from Kulludghee, there are large excavations in beds of argillite, which formerly furnished hone-stones for the supply of the Madras Presidency. They are now partly filled up with rubbish, and have not been opened for many years. Near Moodhul, however, I was told hone-stones were still quarried.

At Alyeondee there are some fine colored marbles—colored green principally with chlorite, and in the vicinity a fine-grained lithographic stone. There are beds of flagstones at this village which are associated with the limestone, but black soil conceals the relations of these rocks. Nearer Kulludghee than the two villages just mentioned, (which are on the further side of the Ghutpurba) limestone prevails. Its bedding is in general obliterated, but when observed it has a southerly dip.

Crossing the river to Kulludghee the first rock which presents itself is a thin bedded flagstone passing into shale, both of which are quarried for building. This is commonly termed slate, but it has not the true slaty cleavages; its planes are undoubtedly those of deposition. The same flagstone, however, in other places does acquire a true change at a considerable angle with the places of deposition, which may be detected by the colored bands crossing the cleavage planes of the slate. The flagstone is well exposed in the quarry, it dips 37° N.N.E.



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The strata within fifty yards are deflected considerably.

The limestone nearest the slate has a strike W. by S. and a southerly dip. The limestone nearest the flagstone has a strike N. by W. and dips south. The slate is W. by N. and dips south. I think it is not unlikely that the slate on the other side of the limestone is the flagstone with a new cleavage impressed upon it.

Proceeding south, limestone and schists twisted and contorted, and with bedding obliterated, are met with along this line, which is one of the disturbed N. N. E. lines.

Overlying limestone and schist there is a hard concretionary limestone with fragments of quartz in it. Near the bazaar it sometimes presents a pisolite appearance, the spots being of a reddish hue when the stone is broken. This belongs to what has been termed the sheet kunkur formation. It extends far more than a mile and a half at Badamee, but here I did not trace it for many hundred yards.

Immediately beyond it we came on a great deal of red ferruginous gravel, with occasionally a consolidated block of laterite coated with manganese, which appears as a blueish-black efflorescence on the surface of the block. This ferruginous gravel is often found mixed up with the black soil, and it is often seen underlying it. It is probably the result of diluvial action just anterior to the deposition of the soil. It is found on the higher ridges or undulations which have no black soil on them. Near the cross dislocation of sandstone and schists forming the hills on the east of this valley, there are quartz and iron ridges. The quartz is cavernous, and the cavities are filled with iron. Scattered over the undulations here and there are vast quantities of iron ore and manganese.

The camp of Kulludghee is partly built on the limestone which forms its western side, partly on the red ferruginous gravel before mentioned, and also on a rock in a fragmentary state forming a brecchia. The wells are sunk through this broken-up mass for thirty feet. It appears to be a schistose clay with some calcareous matter in it, and fragments (of prismatic form) of sandstone. In the nullah near it schists and bands of quartz appear on the surface, and to the south of them a limestone with a very wavy appearance, due to argillaceous bands projecting from the surface, which in the heating process have assumed this outline.

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About two miles north of the Ghutpurba, in a nullah which joins it from the south, the schists are observed deflected N. N. E., like those near Bagulkot, and also like many others in this plain. On the same line limestone of a very white color, fine grained and extremely hard. Beyond it flagstones are again quarried. These flags dip to the south, and as there is an appearance of the limestone close to the camp, dipping north, it may be that an anticlinal exists between the Ghutpurba river and the first Sandstone Range to the south. I lean, however, to the opposite opinion, and consider the flagstones on the north as distinct beds from the other.

At the village of Kucheedonee, about four miles from Kulludghee on the Belgaum road, on the top of an undulation, limestone is exposed for about a hundred yards on one side of the road. The limestone has a strike nearly east and west, and dips south at an angle of 45°. It overlies a schist which is a good deal broken up. It is granular in texture, and of a slaty structure. The planes are covered with talc, and are often colored green with copper, which also permeates in threads through the limestone. Almost every fragment of the limestone has a greater or lesser proportion of the copper coloration. This general diffusion of the copper coloring would lead one to hope that this metal may yet be found in a concentrated form in veins. In the Ural mountains it is near the junction of the limestone with igneous rocks that this metal is so abundant, and the analogies between that range of mountains and the Ghauts are so numerous as to induce one to believe that their metaliferous characters will also be found alike.

From the circumstance of the limestone invariably appearing in valleys and never being elevated into hills in this part of the country, it is very seldom that any large portion of it is exposed, the diluvium and black soil covering so large a part of every valley and concealing the rocks. I am aware that copper has been found in the Madras Presidency diffused through masses of the rock, but nowhere concentrated in veins; and to account for this want of concentration Lieutenant Ochterlony, of the Madras Engineers, applied the doctrine of the German geologists, viz.,—that large masses of stratified rocks being necessary for concentration, that condition was not present in the districts he surveyed, where the rocks were almost entirely igneous, and

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hence iron, copper, lead, &c. though extremely diffused were nowhere concentrated. This does not, however, occur in the Kulludghee districts. The stratified masses predominate over the igneous, and the iron and manganese, though diffused in most cases, are also concentrated in gneiss of quartz.

The limestone and slate are seen in the gorge leading across the Sahapoor hills to the westward. They are on the same strike as those a few miles south of Kulludghee. The slate is thin enough for roofing purposes, but on the surface the planes of deposition limit the size of the slate very much. There are doubtless thicker beds below. The natives make no use of the true slate: so far as I am aware of, it is the flagstones that they use.

List of Rocks, Ores, and simple Minerals in the District, and the localities where they are met with.

GRANITIC SERIES.

1. *Common granite*—Beelgee, and parts of the valley of Kistna adjacent to it.
2. *Eurite*—ditto, and Jaleehal and neighbourhood.
3. *Gneiss*—ditto, ditto.
4. *Argillite*—Hone-stone or Novaculite quarries at Haturki, and other places in the neighbourhood of Kulludghee.

SYENITIC SERIES.

1. *Syenitic granite* at Jaleehal.
2. *Hornblende schiste*—Beelgee.
3. *Green-stone*—Valley N. E. of Bagulkot, valley N. E. of Kulludghee, also in the valley of the Kistna.
4. *Basalt*—Bagulkot bed of river, also four miles north of Kulludghee, and in the Great Basaltic District to the north.
5. *Amygdaloid*—ditto.

CRYSTALLINE LIMESTONES.

1. *Granular Limestone* abounds at Bagulkot and Kulludghee; in general it contains a considerable amount of talc, which gives it a slaty cleavage; very beautifully colored marbles are occasionally met with.

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2. *Dolemite.*—This rock does not appear to have any stratigraphical position, but is met with in various places where there has been an effusion of magnesia.

UNCRYSTALLINE SEDIMENTARY ROCKS.

1. *Conglomerates*—on most of the Sandstone Ranges.
2. *Sandstones* of every variety, but principally a quartz sandstone.
3. *Flagstones and Shales*—neighbourhood of Kulludghee.

COMPACT LIMESTONES.

In great abundance in the neighbourhood of Bagulkot and Kulludghee.

Calcareous Tufa—Bagulkot, Kulludghee and Badamee.

Marl—Kulludghee contains recent shells.

ORES AND SIMPLE MINERALS.

1. *Quartz* everywhere.

2. *Calcspar*—most abundant near Bagulkot, village of Guddunkerree.

Copper Coatings on the laminæ of a talcose limestone at the village of Kucherdowee, about four miles from Kulludghee; the rocks as far as they are exposed have this copper coating. Dissolved in acid it effervesced, and gave a metallic coating of copper on iron.

4. *Specular Iron*—in quartz veins in the range of hills south of Bagulkot, and at the village of Benhuttee.

5. *Brown Hæmatite* abounds on the elevated tract between Bagulkot and Kulludghee.

6. *Quartz Iron Ore*—Sandstone hills wherever an effusion of iron has taken place.

7. *Argillaceous Iron Ore* in almost every part of the district.

8. *Perlomelane* (compact manganese ore)—elevated tract between Bagulkot and Kulludghee in great abundance.

9. *Pyrolusite* (ore of manganese) ditto, ditto.

10. *Magnetic Iron Ore* in crystals, disseminated through masses of rock.

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In concluding this Report, I may mention that the observations of which it is the result, were made during two months of an unusually wet monsoon, and under the further disadvantage of indifferent health, which compelled me in the end to give up the survey of the district before it was completed.

Incomplete, however, as my examination of the district has been, I have attempted to describe a portion which may be taken as a type of the whole.

A. AYTOUN, Artillery Lieut.

Vingorla Point, 20th Jan. 1853.

To J. D. Inverarity, Esq., Col. & Pol. Agent, S. M .C., Belgaum.

No. 1598 of 1853.—GENERAL DEPARTMENT.

To the Secretary to the Geographical Society.

SIR,—With reference to my letter No. 4465, dated the 27th December last, I am desired to forward to you copy of a communication from the Collector of Belgaum, No. 89 of the 16th ultimo, and of its accompaniment.

I have the honor to be, &c.

J. G. LUMSDEN, Secretary to Govt.

Bombay Castle, 11th May, 1853.

No. 89 of 1853.—GENERAL DEPARTMENT.

To J. G. LUMSDEN, ESQ., Secretary to Government, Bombay.

SIR,—Adverting to the 3rd para. of your letter No. 4463, dated 27th Dec., 1852, copy of which was transmitted to Lieut. Aytoun, I have the honour to submit a letter from this officer, dated the 13th instant, in which he impugns the correctness of the Assay Master's conclusion therein noted, in regard to the absence of gold dust in the sample of sand submitted with my letter No. 381, dated 13th November 1852, and requests that his counter-assertion of the existence of such gold may be given in a note to his second Report, which is in course of publication.

I have the honor to be, &c.

J. D. INVERARITY,
Collector & Pol. Agent, S.M.C.

Collector & Political Agent's Office, Belgaum, 16th April, 1853.

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To J. D. INVERARITY, ESQ., Political Agent S. M. C.

SIR,—I have the honor to forward a copy of one of my reports to you on the Geology of the Southern Mahratta Country, which has, with the permission of Government, been published in the Geographical Society's Transactions, and to draw your attention to the closing paragraph of Mr. Lumsden's letter, in which a statement of the Assay Master regarding the sand I forwarded to you from Dharwar, is given.

It strikes me that my paper is introduced to the public with a very damaging preface; for, as the Assay Master's qualifications to report on what is submitted to him by Government, will probably not be questioned by the readers of those "Transactions," it must appear to them, from my report, that for two months I was labouring under a delusion: that what I supposed to be gold was not gold, and that the whole statement regarding the extensive distribution of the metal in the Southern Mahratta Country (and a few natives in many parts actually gaining a livelihood during the rains by washing gold from the gravel of streams) is a fiction.

I have not been made aware of the nature of the Assay Master's examination of the sand, and am left to surmise; but I have no hesitation in saying that the result at which he arrived was erroneous, and that the gold was present in the sand, although he could not find it.

I may add, that had this sand been agitated in water the gold would have disclosed itself to the Assay Master, without resort being made to any chemical manipulation; but with this simple process of detecting small specks of gold in a disproportionally large amount of sand, the Assay Master is probably unacquainted. At all events, whatever his knowledge on the subject may be, his official duties, as Assay Master, could have afforded him no experience in a purely manual operation, such as that of washing gold out of iron sand.

In justice to me, I hope that my counter-assertion (to that of the Assay Master) may be given in a note to the second report which is in course of publication. A sample of iron sand containing gold from the Southern Mahratta Country similar to that forwarded to you, but with a larger proportion of gold dust, has been deposited by me in the Museum of the Bombay Asiatic Society.

I have the honor, to be, &c.

Bombay, 13th April. A. AYTOUN, Lieut. Artillery,

True Copies.

J. G. LUMSDEN, Secy, to Govt.

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ART. V.—*A Description of the Arabian Coast, commencing from the entrance of the Red Sea, and continuing as far as Messenaat, in Lat. 15° 3′ North, Long. 53° 43′ 25″ East, with some Observations relative to its Population, Government, Commerce, &c.*—By Captain S. B. HAINES, of the Indian Navy.

RAS BAB-EL-MANDEB, (Gate of Affliction or Tears) is a prominent cape which forms the northern side of the entrance to the Red Sea: there are numerous rocky points off the extremity of this cape formed into little compact bays, in some of which small vessels might obtain shelter when unable to proceed through the straits, owing to strong winds, change of tide, or any other cause. Boats coming from the Abyssinian side land their sheep here, and afterwards drive them to Mocha by land, thereby preventing a tedious and difficult *beat-back* against the strength of southerly winds. None of the small points above mentioned project more than a thousand yards from the main land, therefore I may be allowed to include the whole by the name of "Ras Bab-el-Mandeb," except that one uniting with Pilot-rock, which lies a little more southerly. Quoin Hill, (Gibul-men-Ali) slopes on its southern side to the sea, and forms a point. This peak or hill, about 865 feet in elevation, in lat. 12° 41′ 10″ north; lon. 43° 33′ east, can be seen on a clear day from a vessel's deck, at the distance of 35 miles, always presenting the appearance of a Quoin.

To the northward of Gibul-men-Ali, there is a range of hills having an irregular outline on every side, and less elevated, the west end of which bears true north from Gibul-men-Ali. This range is called Gibul Heylyha; the land intersecting these mountains is low, sandy, and barren, a few bushes and spots of grass may be occasionally met with in the valleys, and on this scanty food I found the most beautiful antelopes subsist. There are some very old date-trees in the most extensive valley near Thurbah, and a well of brackish water at which the wandering Bedouins of the Subiee tribe water their camels.

The base of these mountains appears in several places to have been formed from volcanic eruptions. A piece of rock from the summit of Gibul-men-Ali Peak drew the needle considerably from its magnetic pole, although I found it would not attract steel filings. From an adjoining hill I obtained a specimen of limestone quartz, with others of

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schistose structure. So sensibly was the needle attracted on the summit of Men Ali, that in endeavouring to get theodolite bearings, I found them differ thirteen degrees from the true pole.

The square dark hill, called by the Arabs *Thurbah*, has some interesting ruins, and the site of an old village near it—probably the ancient Occylis, for which it is rather conveniently situated, having a small anchorage, with bold steep rocky points around it.

Perin, or Meyune, is a small island at the mouth of the Red Sea. Between this island and the Arabian shore there is a good channel, called the Small Straits, and another called the Large Straits, which divides it from the coast of Abyssinia. Captian Elwon, I. N., has, I believe, already given a description of this place, and therefore I need only offer those remarks which possibly may have hitherto been left unnoticed.

Perin consists of one barren rock with very little appearance of vegetation, and no water; it is about four miles long and two and a half broad. The highest part is 230 feet above the level of the sea: when approaching it from the eastward it declines to a low point at the S. E. end. Perin possesses one great advantage by having a beautiful harbour on the southern side, with an entrance round the three points from the low south east point of the island.

The harbour is about half a mile wide at the entrance, not dangerous, with sufficient space for a small vessel to turn in and take up her station according to the prevailing winds. A tank, and the ruins of two barracks are to be found on the south western side of this island, with many other ruins, and several graves, as well as the remains of the rudely constructed pier; indeed, the traveller is constantly reminded of the fact, that the British formerly occupied Perin (in the year 1801). The needle was here affected to the extent of nearly three degrees on the rocky part of the island, but on the sandy beach, at a distance from any rock, I found it agree with other observations taken at different places at the entrance of the Red Sea.

THE BROTHERS, OR, JEZERET SUBA.—Why these rocks should be called Suba, I am at a loss to imagine, as there appear to be only six, unless indeed the rock which lies on a level with the water off Ras Sejarne may have been considered as the 7th; then again there is another rock might be counted the 8th, vide Horsburgh,—according to my observations, I should be more satisfied to name the "Brothers" as being six small rocky

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islands extending five and a quarter miles in an east and westerly direction. The most westerly of the six is decidedly volcanic. Its comparative size and shape will be best understood from a sketch accompanying this. The High Brother, being the fourth from the westward, is about 350 feet above the level of the sea, and forms a conspicuous peak: there is a small bay on its northward side, abundantly supplied with turtle and fish of various kinds. The peak of this island is in lat. 12° 28′ north; long. 43° 29′ 50″ east, within a few miles of the true meridian of the Pyramid erected on the most elevated land on the island of Perin. A low rock islet to the westward is the only part which may be considered at all dangerous. The different soundings between the Brothers are as follows:—

Ras Sejarne and No. 1 westward.	-	-	6 to 12	Fathoms.
No. 1 and No. 2.	-	-	17	„
No. 2 and No. 3.	-	-	17 and 18	„
No. 3 and No. 4.	-	-	24	„
No. 4 and No. 5.	-	-	17	„
No. 5 and No. 6.	-	-	25	„

The main from the westward Brother is only 4,624 yards from the eastward, 7 miles with soundings the whole way, and a safe channel. The currents and tides are rapid and irregular, with a rise and fall of about seven feet, equal to that in the small strait. The channel between the Brothers and the Abyssinian coast may be called a southern strait, being perfectly safe with secure anchorage, and thus we might reckon them the northern, southern, and centre, or large strait. The Brothers are of a brownish colour, and of considerable height, five out of six may be seen from a great distance, in clear weather. The High Brother is sometimes discernible as far as 29 miles distant, the western 22, and the second westward 26.

Ras Sejarne is a Cape on the Abyssinian shore, forming the southern point of the entrance to the Red Sea. This Cape presents a gloomy appearance; it is connected with the main by a spot of land about 700 yards broad, having a swampy bay, surrounded with mangrove bushes to the westward of it; Ras Sejarne is a little more elevated than the High Brother, its shape resembles a peak. It is not dangerous to the eastward, and there are good soundings close to its north rocky face; but from a small bay, to the eastward of the peak, a bank commences

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gradually increasing to a mile or more off-shore, and shoaling from five and six fathoms on its outer edge.

The Abyssinian coast from Sejarne to Ras-el-Bir continues almost twenty miles very low, and sandy near the sea. There are three or four remarkable table ranges of limestone mountains in the interior of this place called Jebul Jarne, of great elevation. The shore is covered with jungle, with an abundance of the mangrove wood, which appears to be in great request among the people,—several small boats laden with it were waiting to proceed to Mocha and dispose of it at the market there. I met but few inhabitants, and those apparently half starved and most wretched looking specimens of the Denarkalee tribe: from these poor creatures we learnt that the only fresh water was to be found near the hills full ten or twelve miles distant from their present habitations. Amongst the feathered tribe I perceived the ostrich, flamingo, curlew and plover; there are also a few jackals, foxes and hyenas.

The soundings on this part of the Abyssinian coast are pretty regular, with a sandy bottom of from six to twenty fathoms, but the shoal along the line of coast, which I have before alluded to, extends from Ras Sejarne the whole way to Jebul Jarne diminishing at each end, and widening towards the centre.

At the back of the southern bluff of Jebul Jarne I discovered the remains of a large Bedouin encampment, which evidently had been deserted by a party of the Denarkalee tribe. The customs of these people exactly correspond with those of their brethren, the Subiee Arabs, on the opposite coast, who leave the sea-shore during the months of June, July and August.

To the southward of Jebul Jarne there is an extensive plain covered with bushes and jungle,—the table land of Jarne forms its northern boundary, opening to the westward on an extensive range of mountains,—called Gibul Tejoora, which from thence continue along the coast in a southerly direction. The little village situated inland is named Tejoora. The territory of the Denarkalee tribe of Somaulees extends for some distance along this coast and for many miles inland. The only instance upon record of a female sovereign being placed at the head of this tribe occurred in 1836. The neighbouring people hold the Denarkalees in very questionable respect, generally considering them to be a cruel, deceitful, inhospitable and treacherous set.

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GIBUL-EL-HEYHJHA.—A bay on the eastern side of cape Bab-el-Mandeb.

The land surrounding this bay is low and barren near the sea. To the northward of the Heyhjha range mistakes frequently occur in making the Straits, the land being scarcely preceptible until you approach within a few miles of it; thus when nearing cape Bab-el-Mandeb, it bears the appearance of an island; the coast from Gibul-el-Heyhjha, to the eastward (beginning from the date-trees of Sekeya) gradually ascends to the lower range of hills called Gibul Hedjaff. A ship standing into this bay, in the day time, would find it better not to approach within ten fathoms, and during the night fourteen might be safer, as some of the knowls have only three and three and half fathoms on them, and are situated outside the reef distant about one mile from the shore. Water and fuel are to be easily obtained here, the former is procured from a well scarcely two miles to the eastward of the Sekeya Date Trees, and the firewood was strewed on the beach in large quantities. Gibul-el-Heyhjha is deep, and formed by Bab-el-Mandeb to the westward, and Ras Arrar to the east, but its depth is more particularly observed immediately to the eastward of Cape Bab-el-Mandeb. Ships working to the Straits during the strong N. Westers of June and July will find this bay convenient shelter; for notwithstanding the wind comes across from Bab-el-Mandeb in strong gusts, still the water remains perfectly smooth.

GIBUL HEEJAFF, a low range of hills running along the line of coast to the northward of Gibul Arrar; they have a dark aspect and are far inland, irregular in outline with a bluff to the westward.

GIBUL ARRAR ("Chimney Peaks of Horsburgh,") a remarkable range of lofty mountains extending in a N. W. by North direction. The summit is irregular, appearing like one continued chain of peaks for the distance of eighteen miles, then terminating with a barn which has a small peak in the centre of it. These mountains seem composed of granite and present a dark appearance, bounded on the north by a still higher range, all of which, I think, are inhabited partially by Subiees.

The coast between Gibul-el-Heyhjha and Ras Arrar also lies very flat, with small projecting rocky points forming little bays, with shingle and sandy beaches. The gradual ascent to the hills is thickly covered with bushes;—we met a few wretched fishermen from whose

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appearance one would be induced to form rather an unfavorable opinion of the fertility of their country:—however, occasionally, we saw less meagre specimens of this desolate race, and once our party encountered a number of Subiee Bedouins, fully accoutred for war. During little excursions we passed a few antelopes and hares; and it is amusing to observe the former cooling themselves on the shore during the heat of the day, but as the sun declines, they disappear altogether. A navigator may here find the soundings a correct guide, and I should consider it advisable not to venture within ten fathoms during the day, and fourteen in the night time, owing to a number of small shoal patches inshore.

Ras Arrar—the southern Cape of all Arabia, is a very low, sandy rounded point, with a bay on its western side. It is in latitude 12° 35′ N., longitude 44° 1′ 20″ E., and is certainly one of the most dangerous capes on the coast, being in the direct route for vessels proceeding to and from the Red Sea. This cape lies so flat, that at night it is hardly discernible, in fact difficult to distinguish; besides this, there is a dangerous bank running to the eastward from it:—within the period of my acquaintance with this part of the world several vessels have been lost here. In the July of 1836 a fine ship was wrecked on the nearest patch to the Cape, where I found only one and a half fathom. The best mark for ascertaining correctly how near a vessel approaches off this cape is Barn Hill. At the east end of the Arrar range of mountains, bearing true No. 3 W. on the shore to the northward (in the depth of the bay) a few scattered date trees and a supply of fresh water may be met with, but no soul or sign of habitation was to be seen near the beach; and I believe it is unusual for the crews of trading vessels to land on this coast, as the natives seem to be of a hostile and ferocious caste.

There is a bay to the westward of Ras Arrar, forming a comfortable shelter for a vessel against the strong east winds during the N. E. monsoon; she can choose her own depth in from twelve to six fathoms, laying in smooth water perfectly safe. The coast immediately surrounding this bay is rather bold and steep.

In an easterly direction from Ras Arrar to Khore Omeera, the shore has the same flat appearance, fronted by a bank of sand to the distance of three and three and a half miles off shore; the shoals are frequent and dangerous, suddenly shoaling from fifteen fathoms,—indeed, in some

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places a ship with good headway could not possibly have time to get a second cast of the lead before she must inevitably feel the bottom.

The land here possesses still an unattractive and dreary aspect, without anything to interest or attract the eye, except when it wanders the mountains in the distance;—these are picturesque, having the sharp peak of the Arrars on your left, and the high rugged mountain of Kurruuz on your right; immediately before you, however, there is nothing to relieve the barrenness so general on this arid coast.

We held but little communication with the people in this neighbourhood,—whenever any of our party were compelled to do so, it was always with a degree of suspicion. They are a particularly barbarous tribe, but since I shall have occasion to mention them more accurately hereafter, I will not tire my readers by two descriptions of so uninteresting a race of men.

Immediately on leaving the mouth of Khore Omeera, the sand bank diminishes in distance offshore. I anchored well in, and thereby escaped the force of the prevailing winds, with the swell perceptibly broken by the reef east and west of us.

Khoree Omeera, a remarkable inlet situated directly south of Gibul Kurruz (high land of St. Anthony,) it is of considerable extent, and formed on its southern side by a narrow strip of sand with only one fathom on it at the entrance, gradually becoming more shallow and intricate for the distance of two miles, then opening into a fine clear expansive basin, with three, four, five and six fathoms at low water spring at high water; the low south side of sand is very nearly covered.

The natives from the neighbouring places, who sometimes visit here for shelter, commit sad havoc amongst the little property belonging to these miserable people, stealing their sheep, and plundering them to the full extent of their possessions. The natives of this coast bear a sad character for hospitality and barbarism; but this I attribute in a great measure to the frequent invasions from which they suffer, and the uncompromising dispositions of their neighbours. There are many instances still on record of severe injuries received by those who have attempted to land on these territories, yet it seemed to me that the inhabitants only require civil treatment in order to conciliate them.

Gibul Kurruz (High land of St. Anthony) is a mountain composed

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of granite and limestone, of considerable height, being 2772 feet above the sea on its high northward small peak, and 2085 on its southern, which forms a bluff on the summit of the northern peak. On the western side I observed a ruin of hewn stone, bearing no date or inscription, but it is nevertheless an ancient and curious relic of savage architecture. This peak is named Gibul Ginn (or the Fairy Hill) on account of an interesting traditional legend which associates this building with some unexplained and superhuman origin, and when once a tale gains a breath of mystery, amongst these superstitious people, they treasure up the recollection of it with most religious care, invariably, however, forgetting every particular circumstance of the event for which a place is thus commemorated.

I found a quantity of richly variegated granite about this mountain, but it is principally composed of limestone.

Gibul Gow, a remarkable hill situated about two miles inland, and nearly fifteen miles from Kurruz. This hill may be immediately known from a considerable distance, owing to the peculiarity of its shape, which resembles a saddle. In height it measures 798 feet above the level of the sea. There are three small dark hills to the south and westward of it, and about three miles to the S. S. E. will be seen the black hill forming Cape Ras Ghow.

The sand bank I have before noticed in my account of Ras Arrar and Khore Omeera, as extending for many miles along this coast will be here found to increase considerably in its distance off shore, and I consider that part (which runs out from Ras Ghow terminating in a point) particularly dangerous, being passable for a vessel, unacquainted with the peculiarities of this coast, to ground on one and a half fathoms off shore.

Occasionally the limit of this bank is perceptible from a ship's deck or masthead, but the most attentive precaution should be taken notwithstanding. The person may imagine himself a veteran in these matters, for several instances of the wreck and loss of buggaloes, besides other vessels have happened since the commencement of my survey. I would not recommend a navigator to approach nearer than 20 fathoms from the low point of Ras Arrar to Ras Ghow during the night, but in daylight he may stand into not less than 15 fathoms; but here even great care is necessary,—the soundings towards it which I have had were 16. 13

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2½ fathoms, heaving the lead as quickly as possible. On some parts of this bank the water breaks at low and spring tides.

The coast between Khore Omeera and Ras Ghow continues low and sandy, strewed with a few bushy shrubs, and here and there a rocky point interrupts the desolate tameness of the scene. Ras Ghow is in lat. 12° 39′ 45″ north ; long. 42° 32′ 30″ east.

The coast to the eastward of Ras Ghow as far as the next cape (Ras Amaran) is flat and sandy, and for many miles in the interior nothing is to be seen but the same sterile uninteresting land, or ragged wild bush covers some few acres, and even this dreary waste presented beauties which seemed as astonishing as they proved welcome to our party.

The antelope, hare, plover, partridge, and bustard dwell here in all their native loveliness, whilst small birds of the most exquisite plumage surprised and delighted us with their soft and melodious notes. These indefatigable songsters are indeed fated "to waste their sweetness on the desert air," for a more barren unverdant wilderness cannot be imagined, than that which they inhabit.

The coast here forms a deep bay with tolerably regular soundings, having 12 and 13 fathoms for two or three miles off shore. The bottom is principally of clay and sand, in other places clay and shell, and in others patches of rock. On the eastward side of this concavity, close to the cape and mountain of Amaran, ships and boats will find excellent shelter during the prevalence of easterly winds. This is a safe shore, therefore vessels of any kind may choose their own depth and distance on it.

At Ras Amaran the territory of the Subiees terminates. It may hereafter prove of some importance to understand more particularly the dispositions and domestic habits of this singular people; I will therefore record the trifling information it has been in my power to collect, for although their extreme seclusiveness and uncultivated manners may render a description of them unentertaining to many, yet it should be remembered that I make my humble effort exclusively for the benefit of those who seek an acquaintance with these localities, and this wish may happily produce interest when, otherwise, my information respecting this race of savages might become unpardonably insipid.

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The people of the Subiee tribe are, notwithstanding their vast number, very little known, and less appreciated. The suspicious manner with which they regard strangers of every kind is entirely owing to the ungenerous treatment of their neighbours, who frequently visit them from seaward, bearing terror and vengeance in their approach. When thus driven from the little property they possess, of course it becomes indisputably the prize of the plunderers, and this, too, is generally done under the plea of friendship. The Subiees use various implements of war, among which are the creese or knife, matchlock, spear and sword, and the constant attack upon their hospitality has inured them to every species of revenge. They are naturally, I should think, a kind and communicative people, formed by figure and constitution for the endurance of every hardship and privation. I was particularly anxious to have some intercourse with this tribe, and after many unsuccessful efforts, Lieutenant Jardine was fortunate enough to procure a hearing, It was some time, however, before this could be effected. The landing of our party alarmed them considerably, and we had the satisfaction, after all our trouble, to see them speedily take refuge in the interior: however, perceiving the fright we occasioned, I gave orders for the crew to fall back, and permit Mr. Jardine to advance alone. This conciliatory manner had the desired effect, and those who stayed to watch us, returned, entered into conversation by means of an interpreter, and separated afterwards on cordial terms, promising to bring us some of their cattle for sale. They were most punctual in the observance of their promise, and I bought two or three very good bullocks of them for three and four dollars a head, also a few sheep.

Having advanced thus far with our new acquaintance, I thought it would not be unadvisable to attempt establishing the good impression our party had made; consequently I wrote a very complimentary letter to the nearest chief, stating the gratification we felt in having discovered the character of this tribe, and hoping that our next visit might receive a more friendly welcome, since the purpose of our appearance among them was not plunder, but a wish to be of service to the whole world by extending the knowledge of one of its proudest studies, added to the desire of communicating with his tribe, of whose merits we had so lately been assured. I also requested that two of my officers might be allowed to visit the hills of Kurruz. To this wish I received an

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immediate and obliging reply, appointing an hour of the next day, when the sheriff would be prepared to accompany the adventurers. This kind proposal we of course instantly accepted, not only as the means of facilitating the journey, but also as a protection against those natives who had not been warned of our communion with their countrymen. True to his word, on the following day the sheriff arrived, duly equipped for the travellers, Messrs. Ball and Grieves, who, thus escorted, penetrated the terrible country of the Subiees, and ascended the gloomy heights of Gibul Ginn, or the Fairy Hill, on which they discovered the ruins of hewn stone before alluded to. I think we may not scruple to date these erections so far back as the time of Nakab el Hajar, Hisn Ghorab, &c.

This excursion inland gave universal satisfaction, and we congratulated ourselves on the perseverance which had effected such an intimacy with our friends the Subiees. It is a strangely unaccountable circumstance, but I have ever seen amongst the most civilised inhabitants of this coast an unconquerable disposition to cupidity and treachery, even among their nearest and kindest friends,—not merely a feeling evincing itself in the character of one or two that you occasionally meet, but a reigning principle of action, and I really almost regretted that we should experience a powerful elucidation of this fact before we quitted the coast of Khore Omeera. I wished to instil into the minds of this people a great idea of European benevolence, and therefore, previous to our departure, sent one present to the chief, and another to our Bedouin acquaintance, consisting of some white cloth, a few common turbans, and about one hundred pounds of rice, which last I begged might be distributed amongst the poorer class (if such could be.) However, when the presents were about to be given away by the interpreter, a party of from forty to fifty Bedouins, well armed, collected round the party, and (attempting to bid defiance to the authority of the chief declared that not one of our purchases should be conveyed to the boat until they had shared in an impartial distribution of the treasures we had given. The boat's crew, however, who were impatient actors in the affair, were not so easily frightened by the clamorous declamations of a few shrieking savages; therefore, seizing those articles already paid for in money, they unceremoniously hurried off with them to the boat, and pushed fairly away from shore, before the astonished Arabs

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could recover the surprise which this bold stroke of the white men had called forth; but they soon rallied and commenced their preparations for an attack, until observing the cockswain coolly giving arms to his crew, the redoubtable Bedouins withdrew to quarrel amongst themselves, and decide the question of the gifts. I always kept my boats armed,—a plan which I conceive to be indispensably requisite upon every occasion of intercourse with these people; for although they possess some latent quality of principle, still the privileges of their creed will always preclude any reliance on the word of faith given by any one member of their community. I did not send on shore again for several days, till they constantly offered tokens of penitence for their misconduct by signs and sounds (more easily imagined than described,) and at length a strange group collected at Bander Arrar with flags and camels finely caparisoned, evidently for the purpose of attracting our attention. This little band consisted of the chief and some of the Bedouins who had behaved so indecently a few days previous, and I had the gratification to find, that either policy, or the inherent virtues of their dispositions, led them to make a formal declaration of their error. After receiving these apologies, the chief would have conferred the honor of a visit on me, but I was compelled to forego such vast condescension, as every preparation had been completed for our departure from this part of the coast; then, after accepting a present of wild honey from His Highness we bade them farewell.

The Subiee tribe have two principal chiefs or sultans, who direct and govern with unlimited authority. Their number is considered to be about 12,000. The women of this tribe partake very little of the hardy stern character of the men; generally speaking, they have light fragile forms, with great depth in the glance of their dark and lustrous eyes,—yet, notwithstanding the delicacy of their frames, all the most servile occupations are performed by them. They wear costume very similar to that adopted by other eastern nations, but the elegance with which this wild people arrange their slight coverings, might be well imitated by the European who would aim at the attainment of nature's best perfection. The hair is sometimes allowed to fall over the shoulders in unstudied negligence; but I observed those who were better dressed usually braided their jetty tresses in a mode more nearly ap-

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proaching the fashion of the civilized Indian. The men wear very light clothing, with a band lightly drawn across the waist for the purpose of supporting the creese, with which they are constantly armed. The Subiee territory is for the most part barren and unfruitful; there are, however, a few productive spots on which they cultivate coffee, fruits, &c. Cattle may be always found in large flocks, as well as a great number of camels. Though this tribe bears universally a spirit of deadly revenge towards their enemies, yet amongst themselves they appear to be a happy and contented race. The religion of the Subiees is Mahometan.

Ras Amaran, in lat. 12° 43′ 30″ north; lon. 44° 49′ 40″ east, is a small rocky island, divided from the main land by a narrow channel almost wholly filled up with rock. It has also a very remarkable hill on its south end. Farther in shore, separated only by a low strip of sand is a lofty mountain 742 feet above the level of the sea, forming the western side of Bander Tujjum, north of this bander lies the tomb of Sheik Summara, surrounded by a few fishermen's huts; off the western part of the island are three small rocks of considerable elevation with deep water close outside them.

Bander Fujjum, a small bay between the high land of Gibul Hassam and Ras Amaran, about six miles broad by two and a half deep with a small round island on the centre of it, and a rock barely covered with water about 800 yards to the E. S. E. of it, with from five to six fathoms between it and the island. A shoal patch extends a short distance off the N. N. W. of this island. There is also a small dark-coloured peak called Jeseret Aboo Shumma, near the tomb on the western side of the bay; and to the westward two anchorages for small boats may be found. The land surrounding the bay to the eastward and westward consists of a low, dreary, and swampy tract of sandy hill, giving each separate range of mountains the appearance of an island at high water. The bottom is principally of sand or mud, and during spring tides the soundings are very regular.

Gibul Hassan, a line of granite hills, the highest peak of which I found to be 1273 feet; a deep ravine winds itself throughout the recesses of these hills, shaping its course towards the small anchorage of Bander Sheikh. The outline of this coast is beautifully diversified. The towering hills of Gibul Hassan forming into one cape, with num-

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berless projecting points, to each of which the Arabs have assigned a name; the most southerly one, called Ras Magillub Haidee, is in Lat. 12° 43′ north, long. 44° 59′ east, and lies to the westward of Bander Sheik.

On the eastern and southern sides of this range are nine rocky islands, nearly connected with the main land at low water springs. Two of these islands lie in the very middle of the entrance to Khore Ghadier, another is situated on the south-east point, called Ras Sullieel, and five off the north-east bluff,—about a mile from the shore, soundings are perfectly safe here, with fifteen fathoms off Ras Magillub Haidee, but as you approach nearer they become less regular.

The white Tomb of Sheik Ghadior is about 1100 yards to the northward of Ras Aboo-Gheama. At the extreme point near this spot the Hagrabees deposit coffee, cotton, and a few other articles of merchandize, in readiness for the small trading boats lying in Bander Sheikh and Ghore Ghadier, the only two ports belonging to the Hagrabee tribe.

At the east end of Gibul Hassan is a double peak of granite, 700 feet in height; from its uncommon appearance it is known by the name of the Ass's Ears. The land to the northward of this mountain continues low, resembling an island when seen from a short distance, perhaps owing to Khoree Bier Hamends almost entirely surrounding its northern base.

Bier Hamed is a fort and village, the residence of the Sultan of the Hagrabees. It contains a population of about two or three hundred, situated almost on the meridian of the Double Peak, at the east end of Gibul Hassan, about three miles from the beach in Aden Harbour, or Bander Toowjee.

The territory of the Hagrabees does not altogether exceed twenty square miles, with a population of about 600 males,—a handsome and dauntless body of men, who keep their more quiet neighbours in a constant state of alarm by the alertness and temerity of their movements. They are governed by a chieftain named Hamed Ben Maidee, who in person conducts them through every kind of war and rapine, and for many years has supported a most resolute independance, until at length compelled by the Sultan M. Hassan to pay a small annual tribute, in consideration for the freedom with which he is allowed to destroy the property of the Abalees.

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The active cunning and infidelity displayed in every instance by this wary chieftain of the Hagrabees, has caused his name to become universally detested among the neighbouring tribes; while his victims, in awe-struck amazement, even applaud the wonderful intrepidity of his successful attacks. I am told that he several times has assisted in the subjugation of a tribe the very day after he has terminated a treaty of peace with them; but the great distrust towards this man originates in the quiet manner he assumes, to first conciliate, and then destroy, the credulous people about him. The Hagrabees are well acquainted with the method of extracting spirit from the date-tree, and, in opposition to their creed, the instances of intoxication are very frequent.

I vainly endeavoured to elicit something like civility from these savages, but all my efforts were useless, until an incident forced them to acknowledge the superiority of my boat's crew. They at first replied to the overtures of good will (evinced by two officers, Lieut. Sanders and Mr. Barrow), by pointing the range of their matchlocks towards them. However, practical experience soon convinced them that the British barrel carried its ball quite as surely as the arms they used, whereupon an immediate retreat proclaimed their concession, and I forthwith reported this inauspicious reception to their chief, who behaved most complaisantly, issuing instantaneous orders for the safety and benefit of our party. The Sultan appeared well disposed towards us (as strangers). Messrs. Cruttenden and Grieves, who obtained leave to visit the town, received very hospitable attention from him, and returned exceedingly satisfied with the interview.

The women of this tribe are generally pretty; a slight elastic healthful form, added to a constant cheerfulness, creates a sort of charm and interest not often awakened by the tawny inhabitants of a desert country. They are particularly industrious, cultivating the land and performing all manner of servile occupation with the greatest apparent happiness.

In these pursuits they are of course assisted by the men. The principal produce of the soil is jawaree, of which they export large quantities. The Hagrabee territory, is bounded on the N. E. by the provinces of the Abdalee and Houshabee tribes, and on the western by that of the Subiees. It is a low flat tract of country, with little cultivation proportionate to its extent; sheep and goats are frequently seen

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in immense flocks grazing on the thin and scattered pasture, tended by the watchful eye of the Bedouin shepherdess,—and a very pretty interesting variety does this scene afford to a person who has been gazing for months together on one continued prospect of plain and mountain, especially when the ear is at the same moment delighted by the merry chirrup of the Baya (bottle-crested sparrow), and the warbling melody of a small beautiful, bright yellow bird, with the smallest legs of crimson.

The aspect of this country is very unpleasing, apparently consisting of one dreary heap of sand hills, scarcely relieved by a jungle bush. Dr. Hutton and Mr. Cruttenden, who travelled for a short distance in the interior, met with thick forests of thorny acacia, where the antelope seeks shelter from the rays of the scorching sun ;—doves are very numerous ;—indeed, notwithstanding the disadvantages of this unfrequented land, there are many objects which serve to enliven the traveller as he passes on. The Sultan has two or three horses in his possession, a great number of camels and bullocks, which I fancy are considerably increased by his successful attacks upon his neighbours. The people of this tribe profess the Mahomedan religion, but are not very strict observers of its tenets, except whenever the morality of Mahomet coincides with their own unlimited excess. To the northward of Gibul Hassan lies the entrance to Khore Bier Hamed, with twelve to sixteen feet water ; about two miles further up this channel the depth decreases to ten and fifteen feet, becoming narrower with the deepest water on the southern side, gradually ending in an extensive swamp.

Bander Toowye, or Aden Harbour.—A deep and extensive bay which lies between the high mountain of Aden (called Gibul Shumshan) forming its south-east side, and that of Gibul Hassan on the south-west ; its breadth is about eight miles from E. to W. by nearly six deep. The Peninsula of Aden is almost divided from the main land by a creek called Khore Muksa, that runs into a considerable distance on the eastern side of the bay, and exactly opposite on the westward the promontory of Gibul Hassan is very nearly separated in a similar manner by another creek called Khore Beir Hamed, of larger dimensions, thus apparently forming two sentinel islands to guard the approach of this magnificent bay. To the eastward there is an outlet in which five rocky islands are situated. The

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most important, named Jezeret Swayeeh, is 300 feet high, and at low water it appears almost united with the main. To the southward, Jezeret Fringee, Kulfatain, Kaset, El Hamah, and Murzuck Kiebir. To the N. E. are two others from which a bank extends for the distance of 3000 yards off the northern shore, terminating in a point and very nearly connecting them with the main. These last are called Jumallica and Allica.

HEEDJAFF is a rocky projection from the mountain of Shumshan. To the eastward of which, a little beyond the point of El Aynah, is a small flint rock with the water considerably deeper off it than to the westward; between it and the shore twelve feet of water may be found. A ship may anchor in any part of this bay. The soundings gradually decrease towards the shore, except off the flat point to the south of Allica, where it shoals rather suddenly; five, four, three and two fathoms may be obtained in each direction, but during westerly winds the smoothest anchorage will of course be found on the western side: if however, it is requisite for a vessel to take up a position elsewhere, I should recommend it to be just past Flint Island. I met with no swell in the bay while the wind was easterly, nor is there any to speak of when blowing from the westward.

RAS TARSHAIN forms the eastern side of Bander Toowye; a vessel may round this point at the distance of 500 yards in four and five fathoms; and also Ras Marlent, laying immediately to the northward of it, proceeding thence keep still on the same course passing Flint Island about 150 or 200 yards to the northward, taking up a position a quarter of a mile to the eastward, where she will find from seventeen to twenty feet at low water spring tides. The tides in the bay are strong and very irregular, owing to the influence of the currents outside; at full and change of the moon I frequently observed the rise and fall of the tides to be about 8½ feet between the hours of nine and ten.

CAPE ADEN, a high rocky promontory, the most elevated part of which bears the name of Gibul Shumshan,* in allusion to the turreted peaks of its summit;—the highest being 1776 feet above the level of the sea. On a clear day I have seen this peak at the distance of sixty miles. Gibul Shumshan is almost entirely composed of limestone. Cape Aden is surrounded by small rocky points, one to the southward called Ras Sincila, in lat. 12° 45′ 10″; long. 45° 9′, makes the south point of this cape;

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and Ras Marshig, on the same rock, serves as a protection to the buggaloes anchored in Bander Duras during the strong east winds. The encroachment of the sea from Khore Mucksa at spring tide so completely seems to environ this cape, that when observing it from a short distance a person can scarcely be induced to suppose it other than a mountain island.

To the eastward of the cape lies the town of Aden, lat. 12° 46′ 40″ N.; long. 45° 10′ 26″ E. Good water may be procured provided a few precautionary measures be observed, such as allowing an European to superintend the filling of the casks, and afterwards seeing they are safely conveyed on board the vessel. The first time of my landing here, I of course did not think it requisite to watch the Natives with such careful vigilance, and consequently my "good faith" was rewarded with salt water instead of fresh. This imposition was frequently practised towards the uninitiated. Jungle-wood may also be had in great abundance, but as almost every article of food is brought down from the interior, vegetables and fruit are always exceedingly scarce. In August and September grapes and pomegranates are procurable; bullocks and sheep appear to be rather numerous, and occasionally a few ducks and fowls may be seen in the market.

Aden bears a striking resemblance to Gibraltar, and could with great facility be rendered as impregnable; its rocky and magnificent heights are even more formidable in appearance, and would require comparatively but a small force to protect it against invasion. The little village, formerly the great city of Aden, is now reduced to the most exigent condition of poverty and neglect.—

In the reign of Constantine this town possessed unrivalled celebrity for its impenetrable fortifications, its flourishing commerce, and the glorious haven it offered to vessels from every quarter of the world; but how lamentable is the present contrast. With scarcely a vestige of its former proud superiority, the traveller only sees and values it for its capabilities, and regrets the barbarous cupidity of that Government under whose injudicious management it has fallen so low.

It was also, during the reign of the Emperor Constantine, that Aden was first known by the appropriate title of the Roman Emporium; and only so far back as the reign of Solyman, we learn that this city was considered of sufficient importance to engage two powerful nations

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(the Turks and Portuguese) in long and determined struggles before either would relinquish the prospect of so desirable an acquisition to their power; however, the slaughter continuing without intermission, and the force of each rival nation rapidly diminishing in consequence, Aden once more fell into the possession of its original masters (the Arabs), who still enjoy their system of monopoly and oppression to the greatest extent; and, not only are the actual subjects of this revolting government made sufferers by its influence, but resident merchants—nay visitors of every nation, are alike rendered the sport of this ostentatious barbarism. Thus the town has lost its reputation, and vainly calls forth all the credulity of imagination to trace (in its present degraded state) the ruins of a vast city. It is thinly inhabited; the population certainly not exceeding 600,250, of whom are Jews 500, Banians, and the rest Arabs. The two former occupy the best houses, and are considerably the most opulent. The town of Aden holds an assistant Governor (or Dowlah), a Custom Master with one or two assistants, and a guard of forty or fifty Bedouin soldiers.

The government is despotic in the extreme, absolute power being vested in the hands of an independent prince, an imbecile old man who readily and welcomely sacrifices everything to the attainment of two adored objects—(indolence and wealth.) This Prince, or Sultan, governing the whole territory of the Abdalee tribe (is named M Hassan Ben Fudthel Abdul Kurreem), fifty years of age. His family consists of seven sons, the eldest twenty-two and the youngest six years old.

HAMED ALI,	
FUDTHEL,	KURREEM,
ABDULLA,	KHAMAS,
ABDUL,	SUBAIL.

I have added this list of their names, as it is customary for the son to succeed the father in the government of the tribe.

There are countless advantages to be derived from the possession of this port; that it is unquestionably the one best adapted for trade on the whole coast of Arabia, is an established fact, both from its natural fitness as a sea port, and more especially on account of its geographical position. It will be a happy circumstance when the merchant and traveller can find easy access to the rich provinces of Yemen, and

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Hydramont, where coffee, gums, frankincense, and other valuable produce will afford a lucrative return for the merchandize of our own country, and sailing vessels be spared the danger and expense of the route through the straits of Bab-el-Mandeb—Aden would thus, no doubt be gradually recovered from its present servile indigence; and as it receives from British perseverance the first step towards regaining its former grandeur and celebrity, England may at the same time find her own views not deteriorated by the effort. The Sultan will perhaps interfere some slight obstacle when he perceives the increasing influence of another power; but his imbecility and grovelling disposition have evinced themselves too recently to render him a formidable opponent to the *persevering blandness* of an European diplomatist. It may not appear an uninteresting digression to relate a circumstance which took place in the year of our Lord 1836, and may serve as a convincing testimony that the valour of this Sultan would present no determined or insurmountable impediment, should the views now in contemplation be ever realized.

A party of the Fouthelee tribe made an excursion into the Abdalee territory, and unmolested, proceeded as far as Aden, which they of course entered, ransacked and robbed of 30,000 dollars; after this, by the advice of their patron saint, Sheik Sein Ben Alvee Hydroose, they retreated, committing very little devastation elsewhere. When the Sultan received intelligence of his immense loss, his rage became ungovernable; and in a transport of passion he ordered that a land and sea force should be immediately fitted out, and the dominions of the Fouthelees invaded without mercy. This was done, and a measureless quantity of powder and shot wasted at too great a distance from the marauders to do the slightest injury to any one of them. The angry temper of the Sultan at length became calm, and he actually entered into a promise to pay a yearly tribute of 364 dollars, 365 mensuries, and 40 camel loads of jowarree, to the invaders if they would proclaim a treaty of peace. This anecdote will not exhibit any extraordinary courage in the character of a Prince, and the Chief of a powerful tribe, containing about 10,000 souls, and able upon emergency to bring 4,000 matchlocks into the field; but they are an indolent irresolute people, too nearly reflecting the conduct of their ruler.

An eminent traveller has compared the scenery of Aden to that of

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Cintra, but the imagination must possess more fertility than mine does, to perceive any just resemblance (in the dreary dark and trackless heights of Shumshan) to the fertile loveliness of that immortal hill.

The most imposing feature in the scenery of Arabia appears in the wild grandeur of its magnificent and dark mountains; although arid and barren to a degree, their variety of shape forms a great and striking beauty.

From the town of Aden, and gradually ascending to the top of Gibul Shumshan, the eye passes over an immense plain, surrounded by singularly pointed hills rising above each other, in every fantastical, form, till nature seems to have raised an amphitheatre of her own, and in commemoration of the work has crowned the summit of these lesser peaks with many an interesting and honorable record of the past.

The remains of several old fortifications, and other edifices, are to be met with amongst the rugged paths of Gibul Shumshan. In 1838, accompanied by Lieutenant Swan, Dr. Arbuckle and Mr. Hamilton, I ascended this mountain, and discovered to my surprise that an excellent road had already been made, from its base to the very edge of its summit, built in a zig-zag direction; or (I would rather say) in one continuation of irregular angles, varying from twenty to forty degrees, ten and twelve feet broad, and in some places raised to the height of twenty feet.

Many centuries must have elapsed since this great and skilful undertaking was completed, yet it is extraordinary to observe how slightly it has suffered from the destructive consequence of time; an engineer of the present day might be induced to question the antiquity of such efficient labourers, but I believe there exists no doubt of the remote era in which this road was constructed. While I was occupied in the more immediate duties of the survey, another important fact was ascertained through the united perseverance of the late Dr. Hutton and Mr. Cruttenden, concerning a narrow path of land which has for many years been classed among the relics of Roman industry. However, these gentlemen have now placed every particular of this (frequently mistaken) track beyond the possibility of dispute, and discovered to the world ("not a Roman road,") but the celebrated Aqueduct of Solyman, extending to the immense distance of 16,320 yards inland. It is built with red brick and stone, and about four feet six

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inches wide, the water-course enclosed measures nineteen by sixteen inches, commencing at Dureib-el-Arabi, a wall at the entrance of Aden and terminating at Biyar Amheit, from whence the water was drawn to supply the several reservoirs placed at certain distances along its side. The vast labor and expense employed by the Turks in securing a sufficient supply of water is almost inconceivable. The number of picturesque over-hanging tanks, which are filled by the mountain stream, and made from excavations in the limestone rock, with the deep hollows beneath prepared to receive the surplus water overflowing from those above, can scarcely have required more indefatigable exertion than the abysmal well of the valleys. There are several tanks of great magnitude in and around the town, and about 300 wells lie towards the plain, many of which are hewn out of the solid rock from 60 to 125 feet deep. The well of Biyar Amheit, before mentioned, is nearly sixty feet in depth, and the ruins around it of a small protecting fort attach an additional interest to its origin; another splendid tank just beyond the wall I have previously noticed was exclusively intended for the use of vessels in the harbour. These innumerable and vast resources naturally must lead a traveller to infer that the population of Aden was indeed considerable, or the luxury of cleanliness estimated by the Turks in a higher degree than by those who now occupy and govern the country. It is very apparent that at least the bare idea of a deficiency was apprehended by its governors as the worst calamity which could possibly befall the people.

Scarcely 250 years ago Aden ranked amongst the proudest commercial cities of the East, but how different is its present condition, even trade depending on the chance vessels passing from the Gulf of Persia, India, and Mocha, from whence the inhabitants procure a few cotton cloths, iron, lead, rice, dates, &c.; and occasionally boats from Burbura, Bander Gassum and Zeyla, laden with sheep, afford the Arabs an opportunity of purchasing cattle of a larger and superior kind to those of their own province. The only commodities exported consist of coffee and jowaree, in very small quantities, nevertheless a heavy duty is levied upon each article of import and export, and although a purchase be ever so trifling it involves a concomitant expense by way of tax. Land is charged at the rate of 25 per cent., and I believe the whole amount of regular revenue duty is about 12,000 dollars annually;—

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albeit the Dowlah manages to increase this sum rather considerably by certain extra charges adapted to the occasion, and it really may be advocated in praise of this liberal steward, that he carefully allots to his sacred master a portion of the immunities arising from the charge by which travellers are constantly defrauded. The Sultan possesses two or three vessels, and is considered the principal merchant of his tribe. It is most lamentable to see an independent Prince, uniting every requisite wherewith to reinstate this fallen city, so completely blinded to every sense of advancement. The trifling cost which is expended to support the dignity he never deserved, certainly does not exceed 800 or 1000 dollars per annum.

On the southward side of the plain just beyond Aden, is a burial-ground or cemetery of the Turks, replete with interest to the historian; many of the graves are wholly constructed of beautifully-veined and clear white marble. The head-stones are generally inlaid with jasper tablets, on which an inscription is engraved, surmounted by the cap and turban (Turkish insignia), relieved by many elaborate and curiously-executed devices.

There are three brass guns still remaining at Aden, and which are no doubt relics of Solyman the Magnificent (this may fairly be supposed from the inscriptions they bear,) perhaps brought to Aden by his fleet in the year 1530, and cast from the models of the great guns he had previously captured from a Venetian galley. The principal residence of the Sultan is at Lahighe, a dirty populous town about fifteen miles from Aden, lat. 13° 2′, long. 45° 00′ 30″, standing on a wide plain surrounded by gardens of date-trees. This palace is built of mud and stone, neither remarkable for its beauty or size. The law of order assuredly never existed here, the streets seem entirely formed by chance, without the slightest regard to paths, or scarcely any road at all; one other stone house adorns the east end of the town, while the less splendid are constructed of cadjan, in the most rude unsightly style.

Lahighe contains probably 5,000 souls, among whom are a few miserable Jews and Somalis. The house of the Sultan is guarded by a host of armed slaves; I do not suppose he has more then 400 soldiers who receive a stated remuneration for their hard services. The scenery and climate of Lahighe are both equally sad in prospect; those

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inhabitants who constantly reside within its walls are sallow, unhealthy small, and slender men, nor do the women possess one charm of person or manner,—an uncouth address and graceless savage air are their only chances to attract attention. The Bazaar is filled with inferior silk cotton cloths, dates, ghee, tobacco, and such like, most of them the produce of their own manufacturers and gardens; a great portion of the land in the neighbourhood is cultivated, and produces a small quantity of fruits and flowers, amongst which I observed the melon, lime, mangoe, almond, plaintain, and jasmine, which last is very highly prized by the Bedouin girls, who link it into wreaths to adorn their raven tresses.

In the journey from Aden to Lahighe the traveller passes through a number of scattered villages, thinly populated, those named Durub Mahula, and Mistera, were collections of the rudest huts, each village having a tower, built expressly for the protection of the villagers. The spoils of three shipwrecks, which had recently occurred, bedecked the persons of this unwarlike people, and many of their weapons were ornamented with gold and silver.

The religion of the Abdalee Tribe is Mahometan, and they are apparently very strict observers of their creed. Indeed, some of the laws, which our civilized ideas began to hope were altogether become obsolete, still flourish here in pristine barbarity. In the town of Aden there are several mosques, but only one is kept in repair, owing to its having been named in honor of a patron saint (Misjeed Sheik Hydroose.) It is supported by donations from those disciples of Mahomed who visit the town, some bestowing their charity from pure respect for the sanctity of the founder, others may be actuated by a more selfish reliance upon his power to grant them a prosperous and safe voyage home again to the land of their destiny; the descendants of this saint are universally reverenced, and benefit vastly by the frequent and munificent offerings to this tomb or mosque. It enables them to enjoy a mode of life and display a richness of dress wholly different from their abject-looking neighbours; yet I ought not to pass by the more admirable traits which have been witnessed in the disposition of this venerated family: on one occasion they entirely clothed and fed a number of shipwrecked starving people, who otherwise must have perished from the cruelty of the Bedouins, who had plundered them of the little pro-

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perty left from the wreck, stripped, ill-treated, and then abandoned the miserable creatures to their inevitable fate; however, the generous frank-hearted goodness of this little sainted community sheltered, provided, and finally restored them to their homes. To strangers, those I would say who are not familiar with the apathetic indifference of these people towards the distressed, this fact may not appear so intimately connected with my present object as it really is; still, I can assure the reader, that to one who has observed them until half reconciled to forego the pleasure of anticipating more than perpetual disaffection and cruelty among these uncultured scenes, a coincidence like that just related seldom occurs, without speaking to the heart in behalf of the unknown savage much more forcibly than the every day plausibility of the uncertain multitude with whom we almost hourly commingle.

The dress of the Abdalees, from the Sultan to the poorest Arab, consists chiefly of the striped turban, more or less costly, varying of course according to the property of the wearer, with the flowing robe, sash and girdle usually worn by Arabs. Their women assume the mask when within the precincts of the town, and generally cover themselves in a drapery of blue cotton of the darkest shade; this appears to be the favorite colour, from the effectual manner inwhich it conceals, not only the age of the dress, but also the habitual indolence of the wearer. I can hardly imagine a more slothful negligent people than these Arabians —unwashed, unshaven, they lounge about the streets, exhibiting the most reckless specimens of degraded humanity; yet they were not always thus, and therefore it may be hoped the redeeming era is not far distant, when we shall see this portion of our fellow men raised to their primitive independence, and the unceasing prayer of a Christian country at last fully answered.

I should not have proceeded so far without describing the position of Seerah, a fortified island commanding the eastern bay and town of Aden. This is a triangular rock about 430 feet high, the most elevated point to the southward, not more than half a mile long by 600 yards broad. Of late years the sand has filled up the small haven which used to divide Seerah from the coast of Arabia, consequently, at low water, it is quite united with the main land, except about two fathoms immediately under the ruined battery on the north side of the island, where small boats frequently anchor.

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On the summit of Seerah stands an old fort of a triangular shape, with a wall which reaches down to the round tower on the other side—the only fortification now perfect. During the dreadful contest between the Turks and Portuguese, the latter obtained possession of this little island, and terrible was the havoc they effected from the commanding station occupied by them, in the round tower just mentioned; they were, however, subsequently defeated by those in the triangular fort, and compelled to evacuate in favor of the Turks.

Supposing the fortifications were repaired and the necessary arrangements made, one would fancy that a mere handful of men could defend it against the strength of hundreds. Three reservoirs for water still remain, but one of them is almost entirely filled up with sand and stones; the other two only require trifling repairs.

In the eastern bay the anchorage ground is very regular, so that a vessel may choose her own position, from five to ten fathoms; during the easterly winds a heavy swell rolls in, but in June, July and August, with the wind from the westward, good anchorage and smooth water may be always found close under the island of Seerah. The hot dry gusts blowing from over the hills are usually very strong and disagreeable.

From Cape Aden the land turns suddenly to the N. N. E. for nineteen miles, then again to the eastward for twelve miles, reaching to Ras Seilan; soundings very irregular, shoal water extending to a considerable distance off shore. Vessels should if possible avoid this bay owing to the difficulty they might experience in getting out of it when blowing hard from the eastward: a ship was wrecked here in 1836, and two buggaloes narrowly escaped sharing the same fate.

The land round the bay is flat and sandy, particularly in the centre, gradually improving in appearance towards Ras Seilan; a low plain spreads itself into the interior covered with stunted bushes, patches of the cotton-tree and acacia, which last thrives in great luxuriance in this dry and marshy soil.

Proceeding easterly, the line of coast for about forty miles is worthy of remark, from its having caused more altercation between the Fouthelees and Yaffaees than any other part of their territories. It honestly belongs to the latter tribe, but during the years of 1837 and 1838 the Fouthelees have driven every other competitor from the field.

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Their great anxiety concerning the appropriation of this land is excited by the abundant produce of the cotton-trees. The last victory gained by the Fouthelees happened within the present year, when they took possession of the three Towers erected a short distance inland for the protection of this highly-favored spot, expelled the Yaffaees, and (I believe) are still in unquiet possession, being constantly subject to the daring incursions of their rival chieftains ; 500 Bedouins are kept in careful readiness to repel the slightest indication of an encroachment.

The village near the Towers is named Gah Wallee, in lat. 13° 6′ 15″ N., long. 45° 24′ E. During my visit preparations were in progress for the renewal of hostilities between this tribe and the Fouthelees, whose twelvemonth's truce would expire on the 18th of January, 1838. 700 matchlocks were already collected, the cotton had been gathered in and forwarded to the interior of the Fouthelee province, thence to be conveyed to Hydramont for sale. The Yaffaees have no vessels of any kind, consequently the trade is wholly confined to the inland.

The population of this tribe amounts to nearly 20,000, dispersed over an immense territory, bounded on the N. E. side by that of the Fouthelees, and on the opposite almost bordering the confines of Hydramont.

The country is mountainous, intersected by large fertile villages (or rather valleys capable of being fertilized) ; coffee, wheat, and jowaree are all cultivated in great abundance, and whenever the Yaffaees chance to be on amicable terms with their neighbours they sell each other a part of the various produce of their lands.

I expected to find the climate very different to what I really experienced, having so frequently heard it described as particularly ungenial, owing to the sudden transitions from heat to cold, yet I will venture (ever in opposition to advanced opinion) to pronounce the temperature of the hills about this coast as the most salubrious that could be anticipated within the tropics, although perhaps a little too cold on the summit of the mountains, which are from 6 to 7,000 feet above the level of the sea. The Natives actually shivered when I questioned them on the subject. These heights seem to be inhabited by a distinct race, who seldom descend to the lowlands, some of them never quit their own frigid atmosphere to be warmed by the heat of the plains. These

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circumstances must have given rise to the idea (which every traveller partakes), that when landing on this coast a person is necessarily exposed to the unhealthful changes of its temperature. The scenery is chiefly in woodland, and luxuriantly watered; the coffee plant thrives exceedingly well in the valleys, and the quantity produced plentifully supplies their own people, leaving a large portion to be disposed of amongst other tribes.

Sultan Ali Ben Ghaleb, chieftain of the Yaffaees and sole Governor of these vast dominions, is a bold, resolute, and fierce Bedouin, with a daring yet handsome expression of countenance. His family consists of several sons and daughters; the eldest girl is married to the Sultan of the Fouthelees, which relationship, however, does not prevent their frequent and ungenerous collisions, making deadly war the compact of more kindred ties: but notwithstanding these incessant contests the father retains a very tender affection for his daughter, and presents are continually exchanged between them by the medium of slaves, who are permitted free ingress and egress throughout the country.

The principal residence of Sultan Ali Ben Ghaleb is at El Gharrah, a town about 100 miles, or 5 days' journey from Sughra.

My party had no apportunity of gaining more than a slight acquaintance with these people; what I observed only tended to confirm the opinions I have previously given, the character of the whole tribe being described in that of its chieftain. Healthy and vigorous in appearance, fierce and trustless in communication, and desperate to a degree when attacked or offended. They possess large flocks of goats and sheep, an incredible number of camels, and a few horses.

Ras Seilan, a low, round, sandy point in lat. 13° 3′ 30″ N., long. 45° 28′ 30″ E. A few date-trees grow near the edge, with larger trees to the northward and westward of it. The bank of soundings (off this cape) extends for about ten miles, shoaling suddenly as you approach the shore, from 100 fathoms to forty, decreasing to twelve fathoms at two and half miles distance, then again gradually lessening.

About one and half mile to the westward of the Cape lies the village of Sheik Abdulla ben Maorbut, containing one square building and a few huts, forming the south and west boundary of the Fouthelee territory, and at which that of the Yaffaee commences.

From Ras Seilan towards Sughra the coast runs in a straight line

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for twenty-two miles, then curves a little to the east, with a sandy beach the whole way.

Barrow Rocks, deriving their name from the gentleman to whom we are indebted for their discovery. They are two dangerous rocky reefs covered by one, two, and three fathoms of water. The surest and best mark by which to clear these, will be found in the dark hill called Kermin Kalasi, forming a saddle from the eastward, which bears from the Sultan's castle at Sughra W. 8° 30′ S., distant four miles. It should not be brought to the eastward of north when coming from the southward, nor approached under fifteen fathoms three-quaters of a mile of them. There is a good channel between the reefs and the shore, of about two or three miles wide.

On leaving Sughra and standing to the southward the town of Al-Salih presents itself (a few miles inland). It contains 200 houses, forty of these are built of stone; its population amounts to 500. The whole trade of this place is monopolized by a few Banians, among whom is the Sultan's agent; occasional vestiges of cultivation relieve the aspect of this uncheering desert, and bids the wearied observer hope for a more lively prospect as he proceeds. To the south east of Al-Salih the tomb of a Sheikh lies near the beach, and a party of fishermen have most irreligiously appropriated it to the most unsaintly uses,—hauling up their boats at the spot, and converting this sacred depository into any thing but a place of devotion. The people of Al-Salih evinced great faith and civility in their manner to us; some of my officers managed to bag a few partridges in their visit to the town.

About six and half miles to the westward of Al-Salih is a village called El Khor, surrounded by low hills in which small towers have been erected for the purpose of its protection. The inhabitants are professed agriculturists, devoting their time entirely to the improvement of the land, and testifying most certainly that the soil of these countries only requires the usual process to render it fruitful and productive. These people irrigate it most industriously, thereby rewarding themselves tenfold for the labour they bestow. At Al-Salih and El Khor the nephew of the Sultan presides as a lesser Chief or Sheikh.

Sughra, the principal sea-port of the Foutheelee province, is a small village in which the Sultan and his family frequently reside for several months; it is protected by a large stone edifice honored

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by the name of Castle. This village is situated on the borders of a plain with the mountain of Gibul Kharazi to the eastward; the valley (leading to Wadi Bahrein) north, and a number of granite hills (terminating in a point which I conceive must be the one Horsburgh has designated the Black Point) to the westward; this last is a small eminence surrounded by a belt of low land, and some distance from the sea.

The population of this village numbers about 200; a quantity of jowaree is cultivated in the vicinity, also a large grove of date-trees belonging to the Castle, which is kept in excellent order by the inhabitants, affording them constant occupation and amusement. One side of the low belt of land commencing at Gibul Kharazi, forms the plain on which Sughra stands, being almost enclosed on every side by the Yaffaee territory, and most admirably adapted to the purposes of trade; it has a small but convenient harbour (formed by a nook or break in the reef,) reaching about half a mile off shore, in which I have seen several buggaloes at anchor. It has 1, 2, and 2½ fathoms on it, and I think it is sufficiently capacious to hold twenty moderately sized boats; the safest mark to be observed for entering this nook is the Castle of Sughra, and six miles inland a dark hill shaped like a barn, with a peak on its west end.

This transmit takes a vessel close to that point of the reef which is most perceptible in approaching from the southward, and inside of which she may choose her situation according to her draft of water. The Honorable Company's surveying ship *Palinurus* anchored in 9 fathoms, 600 yards off the reef, with a sand and mud bottom, and the Harbour of Sughra in a line with the date grove, the Castle is in lat. 13° 21′30″ N.; long. 45°46, E. High water at seven o'clock full and change, with eight or nine feet rise and fall. The flood tide setting to the westward.

The Export and Import Duties amount to 600 dollars annually, and perquisites from every source are indisputably considered the property of the Sultan. Ambergris varies from one to 400 dollars yearly, thus adding another considerable sum to the Chief's income. This place is well supplied with fresh and good water. I purchased several bullocks (similar to those of Surat) at a moderate price, also a few sheep, and poultry, onions, and pumpkins.

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The *Palinurus*, under my command, appears to have been the first European vessel ever anchored on this part of the coast, and certainly it was most amusing to witness the curiosity excited by the men, women, and children, in crowds, collected on the beach to see this "Giant of the Waters;" some proclaimed their amazement by the most unharmonious vociferations; others timidly watched every motion with the stupid gaze of vulgar and intense surprise; while some whose demeanour exhibited a more humanized sense of things, and seemed to attach a deeper interest to our appearance than the mere wonder of the moment, came forward to meet the officers who were landing, and fearfully questioned the motive for the intention. They were easily appeased, and their first alarm almost forgotten when the thunder of three guns rung upon their astonished ears. This was followed by one universal shout of admiration and applause, and the compliment was promptly answered by an apology for a salute from the Castle; when two or three boats were immediately seen pushing off the shore, laden with presents of sheep, fruit, and many other acceptable trifles from the Sultan, who politely requested to know the reasons that could have induced us to pay him the honor of a visit. In reply, I wrote him a civil letter stating the cause of our arrival, described from whence we came, and in fact mentioned every circumstance calculated to allay the anxiety of his enquiries. The next morning brought a note of welcome, expressing every sentiment of friendship and hospitality, assuring me of his eagerness to be made of service to me and my officers, and entreating that he might have the pleasure to see us on shore. Of course I did not scruple to accept this invitation, and hastened to return due thanks for his generous civility.

He had never before seen an Englishman, and consequently our meeting was rather awkward, for the dull earnest manner in which he proffered me the salutation of his country impressed me with a most unfavorable opinion of his sagacity, and, I confess, rendered me something more taciturn than is usual on these occasions; as our interview lengthened he gradually inproved, frequently raising his eye from the ground on which it had obstinately rested since my entrance, till at length it became fixed on me, preparatory to starting me out of a reverie wherein he and his suite had not worn the most pleasing colours, and emphatically demanded an answer to the following question—Whe-

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ther the English, who know every thing, could manufacture a field-piece that should unscrew in the centre, so as to be carried any distance, over mountains by camels or other animals? Imagine my surprise to find such an idea the result of this Bedouin's cogitations. It had evidently originated from his own mind, and proved so different a display of understanding to what I anticipated, that I hoped by yet lingering a little while I might discover something more pleasing about my new friend, and the sequel amply rewarded this trial of patience. He grew reconciled to my presence, his countenance brightened, and his features recovered the intellectual expression nature had originally intended them to possess, but which certainly upon introduction would be pronounced as the most inanimate receptacle for human feelings. After conversing on various subjects, he professed a great anxiety to be on friendly terms with persons who came from the greatest nation of the world; (and truly the reports from the adjacent tribes had done sufficient credit to our characters,) and that when he considered their flattering encomiums, he declared the English were the only people he ever wished to conciliate, remarking that all who did so became equally rich and noble, and that they alone could prevent the Egyptian force from conquering his whole country. Mutual satisfaction followed our interview, and a few hours afterwards his Prime Minister was sent to present me with a beautiful Arabian horse, the best his stud afforded. I had a difficult task to avoid accepting this gift, especially since it was intended as the first pledge of amity between us, civility appeared to demand its immediate acceptance, and most diligently did I incite my ingenuity to devise some way of refusing the kind offering without offending a people whom we may at a future period find it politic to claim an acquaintance with. I ventured to represent the possible hardships and deprivations the noble creature must encounter on board the ship, saying also that I must ever feel highly sensible of his goodness and attention during my visit, and reiterating the pleasure it would have given me to commemorate our first acquaintance by the acceptance of his magnificent gift; but that duty compelled me to remain at sea for many months, and I could not support the pain of seeing his beautiful horse gradually pine to death, in the confined prison which he must necessarily be doomed to occupy in the vessel. My reasoning scarcely sufficed to convince him that I did not reject his

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present from any unfriendly motive: however, it proved the surest appeal to his heart, and I thought the most suitable excuse that could be made, and one which came directly within the limits of his comprehension, for it is singular to observe the kind considerate care uniformly evinced to their cattle by the natives of these wild countries. Thus terminated my visit to the great Chief of the Fouthelees, and the retrospect will I trust be as gratifying to him as it certainly is to the officers of the *Palinurus*.

The name of this Sultan is Abdulla ben Hamed ben Fouthelee. In 1837 his family consisted of three sons and three daughters, under the age of twelve. His present wife (the mother of his six children) is a daughter of his neighbour Sultan Ali ben Gorleb, of the Yaffaees. Five of the Chief's brothers live with him—Salur, Nasur, Fouthel, Ebraim, and Marzur, besides a little multitude of nephews and cousins, to whom he awards a separate dynasty as they arrive at a proper age; but this power is never extended towards his brethren, who are constantly near him, and whose actions are noted with the most rigid scrutiny. I had the honor of an introduction to three of these gentlemen.

Abdulla ben Ahmed ben Fouthelee is a man of slight proportions, and far from prepossessing in appearance. His greatest happiness appears to depend on the indulgence of his restless disposition. Constantly seen on horseback, with his charger fully caparisoned for war, resting during the day, and perpetually abroad by night, he forces the sheiks of the different districts to a vigilant discharge of their duty,—they never being apprized beforehand of the frequent visits he pays them. He is represented by his tribe as extremely energetic in address, enterprising and determinate in war, astute and subtle in transactions of commerce, yet withal possessing an inordinate respect for justice and benevolence. In the execution of his sentences he observes a scrupulous adherence to the punishment he originally determines to inflict, and on no occasion whatever has he been prevailed on to mitigate the rigour of a sentence once awarded. Some palliation may perhaps be found for this resolute and obstinate tenacity when we hear that he calmly attends to every argument adduced by the parties, both *pro* and *con*, previous to the condemnation of his culprit. Two instances, related to me by one of his followers, may serve to elucidate the usual severity of his judgments.

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A slave at Assule was convicted of burglary in the house of a Banian. The Sultan, after minute inquiry, sentenced the captive to be drowned. He was accordingly placed in a boat, rowed to a considerable distance from land, and then mercilessly thrown overboard, with a heavy weight attached to his legs, in order to prevent any chance of escape. My second tale relates to a native of Sughra, unhappily discovered in the act of making a small hole with his finger in a bag of jawaree, for the purpose of satisfying a most craving appetite. This was a case of theft, but owing to the emergency which induced it, the man's finger was only cut off and sewn to the bag as a warning to other hungry wretches: yet this was considered but a slight punishment for the crime committed. Let us then at least infer that honesty may be anticipated from a man who can hold a breach of it in such fearful abhorrence.

The Sultan is the richest merchant and the principal agriculturist of his tribe. According to the most authentic information, his private property consists of thirty-five horses, 2,500 camels, and about 10,000 sheep. Wheat, jawaree, dates and plantains are the general produce of the soil: jawaree and dates appear to be indigenous throughout the provinces of this coast.

As a chieftain the Sultan ranks particularly high, his tribe is computed at nearly 15,000 souls 4,000 of whom are perfect warriors, carrying as many matchlocks and bidding defiance to the people around them; but a notion of prudent policy nevertheless keeps them on good terms with the Owilyees, whose number greatly exceeds their own. The Yaffaces and Abdalees are the most frequent losers by their close neighbourhood.

The territory of the Fouthelees extends (northerly) to the distance of eighty miles, bounded on the east and west by Makatein, and Sheik ben Maarbut, or Ras Jaglar; the greater part of this province is mountainous, Gibul Kharazi, (the highest point) is about 4,442 feet above the sea. The valley of Wadee Bash Rann winds itself in beautiful luxuriance among the intricacies of this hill, embellishing it with lovely streams of fresh and excellent water flowing into one vast and extensive lake, from whence the valley derives its name.

The largest village in this province is called Maine, containing a population of nearly 1,500; it lies to the N.W. of Sughra, thirty-six hours' journey.

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Each town or cultivated district is defended by block-houses. The inhabitants themselves for the most part inhabit the natural excavations about the mountains and rocks, leading quiet pastoral lives, and bestowing all their cares and affections on their families and flocks. Yet, notwithstanding this love of seclusion, they are ever obedient to the Sultan's word, exchanging upon the moment the peaceable retreat of the valley for the daring and more hazardons adventures of war and turmoil. The men cover their slight figures with a dark blue folded cloth bound over the loins. The women assume a greater degree of elegance in their attire, wearing a loose robe of the same colour, with long hanging sleeves. The hair of the younger women is always arranged in a most becoming style; braided and plaited in a hundred different sizes, it is permitted to fall over the shoulders in a bewitching negligence, which adds considerably to the graceful freedom of their manner. These people did not endeavour to escape observation by concealing their faces in the drapery about them, (as others frequently do,) but returned our looks of admiration with a very original simplicity. The Foutheelees are assuredly the prettiest women I ever met with in Arabia, and from the urbanity and frankness of their intercourse with us, created an universal feeling of kindness and interest.

My party were exceedingly amused by very many perfectly rational tales of elopement and mesalliances, amongst this rude uncivilized community.

The men dwelling near Sheryen were all well armed, and the salutation with which they greet a brother soldier in passing, is by squaring the matchlocks above the head, thereby bespeaking friendship as in other countries; a different welcome betokens the ordinary acquaintance or relation—these last merely exchange a mutual touch of the hand, answering the purpose of our more deliberate English compliment of "good morning" or "good bye," On entering the presence or approaching near to the Sultan, they immediately bend the knee and kiss the earth, this is repeated according to the respect they require to shew.

The Hirka, or Kallian, is almost unknown here; very few of this tribe enjoy the luxury of smoking in any way, as it is considered too debilitating a practice for men trained to war.

The people occasionally eat meat, but their general diet is of bread, dates, jawaree, wheat and milk. They export a large quantity of a very superior kind of ghee.

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At the time of my visit to this place the prices of their exports were as follows:—

	lb	Dollar.
Coffee.	12	1
Jawaree.	150	1
Ghee.	24	1

I believe they grow no fruit except the plantain, nor do they appear to have the desire of cultivating any other. Rice is highly prized by them, whenever they are fortunate enough to procure such a treat.

The Fouthelees are professedly Mahomedans, but so careless in the observance of the Koran that even the fast of the Ramazan passes without the knowledge of the mountaineers; and this, according to their ideas, amounts to the very climax of disaffection amongst the more strict adherents to the faith. Young men are not permitted to marry until the most barbarous law of their creed has been performed, which usually takes place at the age of twenty.

From Sughra to Makatein Zegher the coast becomes very irregular, jutting out into small rocky points, and for some distance the land near the sea is particularly flat until approaching Gibul Kharazi, about thirteen miles to the east of Sughra. The ascent of this mountain begins at the edge of the shore, very gradually decreasing from it the whole way to Makatein Zegher.

Advancing to the eastward you suddenly lose the bank of soundings which reaches from Aden to the Fouthelee Hill or Gibul Kharazi, and find instead twenty or thirty fathoms water inshore. Whilst on the bank the soundings are a correct guide, and when off it a vessel is equally safe, with a mountain of 5,000 feet in ascent towering directly over her head.

Gibul Fouthelee, thus named by Arab Navigators and by the inhabitants. Gibul Kharazi is an immense mountain or range of hills running parallel with the coast for nearly twenty miles. The highest part is at the west end, and upwards of 5,400 feet high, and declining to the eastward.

The summit of this range is singularly shaped into gables, peaks and bluff points. The most conspicuous gable is nearly in the centre of the mountain, or near west, rising 3,900 feet above the sea. This hill is very remarkable from an opening like an immense embrasure, which gives it (from the eastward) the appearance of a double peak,

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from whence it suddenly descends, so as to fall almost perpendicularly towards the sea. The villages intersecting Gibul Kharazi are thickly covered with vegetation.

I failed in obtaining anchorage near this mountain; consequently the hope of traversing one or more of the beautiful valleys was wholly relinquished, and the regret of my officers greatly augmented by the knowledge that these unexplored regions possessed a coolness of temperature to which they had long been strangers. I think a geologist would decidedly class the range of Gibul Kharazi among those mountains which are wholly composed of limestone; of course some slight variety will exist every where.

MAKATEIN SEGHIR is merely a small boat anchorage caused by four projecting rocks, and one other which is sunken. It has a shoal and rocky bottom, and boats should anchor with their coir cables in a sandy spot. This anchorage lies forty miles to the east of Sughra.

MAKATEIN, an anchorage to which trading vessels resort for shelter during the N. E. monsoon. The Cape, or rather a slightly prominent sandy point, is in lat. 13° 25′ 35″ N., long. 46° 26′ 15″ E.; on its verge some small low rocky islets project in a southerly direction, with their surface perfectly white, owing to the excrescence formed by large flocks of birds constantly collecting on them. Vessels are often employed in clearing and bringing this away; it is afterwards used for agricultural purposes and serves abundantly to enrich the soil. Each rocky point has a channel between it and the next, of one and a half fathoms; there are also several sunken rock soff the outer sandy point; indeed the line of rocky edges, above and below water, extend in a straight southerly direction for the space of 2,448 yards. It is on the western side of these that vessels seek shelter, taking up a position according to their depth. The bottom is almost uniformly sandy, with a few patches of rock.

A ship might anchor in seven fathoms off the outer rocks, and find the swell considerable broken. I have twice done so, and had the water (under lee of the rocks) very smooth, although the wind was blowing hard, and the surf breaking very high on them.

A person may easily find the coast of Makatein by observing the two black hills immediately to the east of it and close on the sea. There are others three or four miles farther east, but not so distinctly separate

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as the first mentioned two; when arriving from the eastward they resemble one long hill.

From Makatein to Howaiyah it is one long flat sandy beach, and in many parts to the westward continues low to the distance of some miles inland, almost reaching the border of the Fouthelee mountain. No danger need be apprehended here, as the navigator will find ten and twelve fathoms about one or one and a half mile from the shore.

HOWAIYAH, a small village containing the principal residence of the Sultan Nasir ben Abu Bekr, chieftain of the Urjali tribe. It is situated inland, so that vessels passing can merely perceive the top of its largest houses. The late Dr. Hulton and Mr. Smith (purser) landed immediately on our arrival here, and forthwith proceeded to the house of the Chief, taking with them a few trifling presents and a letter explanatory of our visit. He received them with a cordial hospitality which quickly dispelled every prejudice against him, evincing the kindness of a host in the most pleasing manner.

After having rested and partaken of the Sultan's farinaceous meal, horses were provided and every opportunity afforded to facilitate their journey through the different hamlets in the neighbourhood. I anchored off this village, entertaining no very favorable impression of its occupants; for it will be seen, on reference to *Horsburgh's Directory*, that in 1715 the boat's crew of the *Nathaniel* (merchant ship) were desperately murdered at this place; now I am happy to say it was not then possessed by even the ancestors of the present chief, the Urjalis having conquered it from the Beeri Laads (a subdivision of the Wyaadees) about sixty years ago. On my first introduction to the Sultan I mentioned the circumstance; he seemed to be perfectly informed on the subject, and recurred to the date of the unhappy affair, in order to relieve my mind from any distrust I might feel regarding the national character of his people.

A short time after our arrival, as my cutter was sailing along shore, some maliciously disposed Bedouins amused themselves by firing into her, and not exactly liking the idea of their sport, I forwarded a letter bearing my complaint to the Sultan, but did not certainly anticipate so summary a method of proceeding as that which followed the receipt of my official. Four Bedouins were almost immediately apprehended and convicted of the offence. The culprits proved to be wandering

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Deabees—trespassing on the dominions of the Urjalis, and not men of his own tribe;—consequently they underwent the ordinary punishment of being confined in a deep well and fed on jawaree cakes, with an occasional cup of water, until a ransom (adequate to the insult and trespass) should be offered from their tribe.

The population of Howaiyah, together with that of the hamlets surrounding, amount to 5,000, all of whom (in time of peace) are occupied in the labours of husbandry, except a few poor fishermen and those directly concerned in state affairs, and in attendance on the Sultan. The government of the Urjali tribe is despotic; its present chief being wholly independent of every other power, and highly esteemed among his people.

The town contains 600 houses erected in the Arab style of sun-dried bricks and cadjan. The largest is in lat. 13° 28′ 45″, long. 46° 47′ 25″ East, five nautical miles from the sea shore. The unmethodical arrangement of the buildings, added to the total absence of paint or chunam, produces a most unpleasing effect. Groups of twenty or thirty dilapidated huts lie scattered over an immense plain, with the intermediate spaces appropriated to the cultivation of jawaree, &c. In May 1835 I observed the people very busily employed in ploughing, sowing, enriching, and preparing the soil in every way, at the same moment that the harvest was taking place. The succession of crops throughout the year is perfectly astonishing; generally, I believe, they do not sow until after the commencement of the S. W. monsoon, when the tanks and wells are amply filled, and the rain descends in such torrents from the mountains that it requires no labour to moisten the ground. Plantations of date-trees diversify the scene, and brighten the abject solitude of the miserable little huts, till (in charity to the traveller) a beautiful and picturesque landscape presents itself; but this is only an illusion produced by distance,—a nearer approach quickly dispels every charm of the prospect. The agriculturists of Howaiyah frequently exchange the surplus quantity of their grain, &c., for dates, iron, knives, and many useful articles with which about twenty or thirty boats arrive during the year, these little vessels then proceed along the coast, readily disposing of the jawaree to other tribes. At Howaiyah I purchased some capital bullocks, with an abundant supply of good water and excellent fish.

NASSAUL, a town of the Urjalis, seven days' journey, or about

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210 miles from Howaiyah, contains the residence of Sultan Abdullah (cousin of the chief), is well populated, and the soil exuberantly fertile.

MUNGA, another small town four miles farther inland, in which the palace of Fareed ben Boobakhur and Hoosanee (brothers of Abdullah) is situated. This is a quiet and secluded spot, and, like every other part of the chief's dominions, enjoys happiness and peace.

The Urjali territories extend about 200 miles north, bounded by Makatein, Gibul Hummaree, and Wadi Sanam to the eastward, the Fouthelee to the west, and to the northward peaked and irregular distant mountains. This coast is very flat except far inland, where hills of considerable height rise in beautiful grandeur, intersected by green and lake-bespangled valleys. During the dry season the pasture is just sufficiently covered with cattle to improve its appearance. Horses, goats, camels, bullocks and sheep were very numerous.

The people of this tribe, when combined, form a powerful body, amounting to 7,000 or 8,000 fighting men; 2,000 are kept constantly armed and ready for war. In person they seem infinitely superior to their contemporaries, being strong, vigorous and warlike. In kindness, gentleness and address the women excel their neighbours, possessing great affability and mildness of deportment. Their clothing consists of the same undulating drapery of dark blue.

The land towards Ras Urjali bears the sullen flat aspect so generally belonging to the scenery of this coast, rising occasionally into small hillocks covered with a jungle bush. Soundings are pretty regular for many miles to the eastward, having 160 fathoms about five or six miles off shore, and nearly twenty as a vessel approaches within one and half or two miles.

RAS URJALI, a sandy cape to the southward. The town of Howaiyah, when perceived from this point, appears considerably larger than it really is, standing on a level plain surrounded by hills, which in the distant prospect causes it to resemble a semicircular valley of great extent, having the Hummaree heights to the eastward, the range of Fouthelee to the west, and innumerable ascents of less magnitude completing its northern boundary, while the surface of the low centre is thinly covered with the dreary tenements I have before described. Twenty-one miles to the eastward of Ras Urjali I found the tomb of Goombahal Sheikah Hurbah, a devotee of Mahomed, so piously accredit-

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ing the faith of this false prophet, that she is said to have perished from hunger rather than persist in the vulgar avocation of eating and drinking, or descend to any custom which was observed by lesser and more earthly natures. This absurd notion gained possession of her senses soon after the appearance of Mahomed, consequently some attribute it to the passion that influenced Mary the first aspirant to the prophet's benevolence, while others assign a more sacred motive to the fate of this beautiful girl, relating that her constant anxiety to inherit the blessed paradise offered to all his true disciples, induced her to try this patient but certain means of obtaining it. This ancient and memorable shrine is erected near the beach, and can be seen for several miles, owing to the chunam with which it is whitened. Seven miles from thence lies Wadi Sanam, being the eastern limit of the Urjali territories; regular soundings continue until you reach Ras Saffwan (a low sandy cape) at which place the provinces of the Deabeas commence.

THE TERRITORY OF THE DEABEE TRIBE on the whole coast of Arabia. No one part can be held in a less favorable light than that which I am now proceeding to describe; its inhabitants do not exceed the number of 800 souls, and the province is equally inconsiderable in extent: still there is a prevailing dread of this ungoverned people, who sustain a perfect independence, and render themselves powerful by ferocity and cunning; unshackled by the controlling hand of a chieftain, they pursue every system of depravity, murder and crimes of the deepest dye reign absolute—in fact, their lives are occupied alone in plundering each other and annoying adjacent tribes. The Urjadees and Urjalis possess the charm of numbers, and thus escape the timorous incursions of this vicious clan. They have no governor, chief, or indeed any superior power amongst themselves, consequently the dread of punishment cannot deter them from these awful instances of most abandoned sin. The women are duly entitled to be the companions of their degraded lords, and, I am afraid, display few redeeming qualities to mitigate the sentence so universally bestowed upon them by their neighbours. The only thing for which they evince the slightest deference is for the patriarchal law; yet this is merely nominal, being seldom required to observe respect towards the old, who retire into perfect seclusion after attaining a certain age, and spend the lingering portion of an useless life uncared for and unremembered.

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The Deabee territory continues as far Ras Gosseyn on the sea, and inland stretches to the northward of the Hummaree mountains. This tribe dwells principally in small wretched-looking huts, and more frequently in the natural excavations of the rocks. Their countenances are fierce and swarthy, with well-proportioned forms and strong muscular limbs.

SHEIK ABDER RAMON BADDASS, a village of the Deabees, situated on the sea coast, near a white mosque standing on a projecting sandy point, and around which a few miserable fishermen have established a little village of their own, having but one small boat (or canoe) amongst the party. A sandy plain begins at this tomb, and reaches for some distance inland, till it meets the base of a high and precipitous mountain, the summit of which is much flatter than those to the eastward; the soundings are still regular, extending for upwards of two leagues off shore.

I am told that a bank of forty fathoms may be met with on this part of the coast, but I was unsuccessful in attempting its discovery, as well as that of another nearly south of Gibul Hummaree, and about half way over to Bombay Gassim, on which report says some small vessels navigating between the two shores have actually struck soundings.

RAS SAFWAN, a slightly projecting point, thickly covered with bushes on its extreme edge, in lat. 13° 48′ N., long. 47° 42′ E., almost immediately to the northward of it will be seen the light-coloured and conspicuous southward peak of the Hummaree range.

WOWRA, lying to the N. E. of the abovementioned cape,—a few huts with several small date-trees, and two white tombs, are all that can be said to form the principal features of this abject village. To the Deabeas it offers a greater interest, containing the residence of Solyman ben Shub, Shub ben, koe Hummar, a patriarchal elder or mukadum. The inhabitants are supposed to amount to 100, some of whom follow the trade of fishermen,—they possess no boats but catch their fish with nets.

GIBUL MAKANATI, a whitish looking bluff point, veined by dark strata. This mountain runs a short distance into the sea, causing the concave shore between it and Safwan to form a bay, in which boats and vessels anchor, thus avoiding any communication with the universally-detested tribe of the intervening places. Gibul Makanati terminates in stony and sandy hills leading to the Hummaree ridge; a rock lies close off it,

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From Makanati bluff several villages may be clearly distinguished in the valleys of this territory. The very extensive one named Wadi Meifah is situated at the eastern base of the Hummaree; five very large groves of date-trees add a beautiful effect to the scene, the most considerable has been pronounced worthy of an exclusive name, the "Ul Hummaree." Makanati is a term of opprobrium of the most infamous kind, and the mountain (I believe) derives its name from the invective indignation of some sailors who had met with great incivility on this coast, thus leaving a very memorable instance of their displeasure.

HUMMAREE MOUNTAIN (or Gibul Hummaree,) a high range of apparently limestone hills rising from the beach, and gradually ascending to the height of 5281 feet above the level of the sea, (which I discovered by means of four measurements). This mountain cannot be mistaken when approaching from the westward, the correct position of its highest peak is in lat. 13° 3′ 40″ N., long. 47° 37′ 30″ E. From the south-east or south-west its summit resembled the roof of a barn. In outline, the whole range presents a dismally rugged appearance, probably owing to the cheerful contrast of the woodland valleys interspersed among the flatter scenery of each separate hill.

NAKAB-EL-HAJAR—Proceeding north, we found this antique and compact fort in perfect ruins, it is built of hewn stone in the most solid kind of masonry. From the circumstance of its being erected on an eminence in the centre of the valley, I should conceive that it must have been originally intended to protect the pass into the interior, since its situation entirely commands the line of road communicating with the villages inland. Mr. Cruttenden made an unfinished sketch of this spot. After passing the outer entrance two other roadways will be found, and a little beyond these a well and different buildings, reassuring us in our first conjecture of the purpose for which it was designed. I was busily occupied in surveying the shore of this place when three officers, Lieutenant Wellsted (Assistant Surveyor), Mr. Cruttenden, and Dr. Hulton volunteered to proceed on an exploring journey across the small villages before alluded to; two of the aforesaid gentlemen (not being able to spare Dr. Hulton at the time, and Lieut. W. from his seniority having the greater claim to precedence), forthwith departed; previous to their quitting the vessel I gave each his instructions, according to an official order, to collect every information

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that might eventually enlighten any subject connected with these countries. The gentlemen left the *Palinurus* off Gosseyn, thence bent their course towards Bel Haff, when guides of the Wyabee tribe were hired to accompany them in their peregrinations. Travelling onwards through an uninteresting flat sea-beach, they passed Ayn-bah-Marbaat, and from thence proceeded inland towards Wadi Meifah, a valley that I should imagine was replete with exquisitely magnificent scenery, from the rapturous terms of admiration with which the reminiscences of Lieutenant Welsted had adorned it.

The public are indebted to these officers for the vigilant industry displayed in their separate endeavours to obtain a satisfactory and correct copy of the inscriptions carved about the ruin of Nakab-el-Hajar; yet unfortunately (the common error of travellers,) in some way or other led to strange dissimilarity in the various characters—forty-two being wholly un-alike. I attribute these material differences, however, to the manner in which the copies were made; both officers being near-sighted, the writings have borne a different size and shape to each, with respect to the inequality of opinion concerning the magnitude of the entrance gate bearing the hieroglyphics, and the proofs advanced to confirm the supposition that other ruins of a similar data existed in the neighbourhood. I can plainly perceive the chief cause of inexactitude. In the first place, by Lieutenant Wellsted's accounts, I made a calculation of the specific gravity of stones composing the ruins, and from his measurement they would appear to be of the enormous size of 8 tons, 1 cwt, 2 qrs, 25 lbs; but, according to Mr. Cruttenden's decisions, one half this allotted weight might be assigned them; then again the former gentleman asserts that the inscriptions are to be found on the northward entrance to the Fort, while the latter seems fully impressed with the idea of their being carved on the southward; now which affirmation is the more credible I cannot say,—there may possibly be two separate writings.

Dr. Hulton was particularly anxious to prosecute a second and less hastened inquiry, whereby to decide the above question; but the unpleasing characters of the inhabitants of the districts through which they were compelled to travel, determined me to abide by the uncertainty rather than lose our time in discord and skirmish, the whole tribe having now become generally aware of our approach. In my own mind

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I feel convinced that the ruin of Nakab-el-Hajar was built by a class of workmen and in the same age as that of Hassan Ghorab (discovered a short time previous by Dr. Hulton and Mr. Smith). In many parts the writings now produced correspond precisely with those of Hassan. I very much lament that the laudable efforts of these enterprising officers were not attended with better success, but have unpardonably digressed into the result of discoverers before pursuing the whole journey of my travellers. The inhospitable suspicions of the natives obliged them to curtail their premeditated advances, and retreat towards the coast; indeed, the journey from beginning to end proved most unsatisfactory. To escape the Deabee territory their route lay along the hot sandy beach, afterwards riding for miles on the back of a camel (no enviable amusement either in warm or cold weather;) on the third day succeeding their departure I picked them up near Jowaree, heartily exhausted by the fatigues of such an adventure. I hoped to have received some more authentic intelligence than which was brought me; however, I suppose the hostility and otherwise ungenerous conduct of the natives occasioned both my disappointment and the unminute examination with which each memorable and exciting relic was passed over. Yet I was delighted to find that in spite of the affecting recital Lieutenant Welsted gave of their insuperable difficulties and unsuccessful research, that during the short space of a ten days' leave (granted for the purpose of arranging his memoranda into a more regular form,) I was surprised by an elaborate and entertaining account of all he had seen or imagined. The elevation of the walls of Nakab-el-Hajar is from twenty to forty feet.

Ras-el-Gosseyn, a low sandy circular cape (at which the Deabee territory terminates,) forming the western point of Marbaat Bay, is in lat. 13° 54′ 10″ N, long. 47° 53′ 20″ E., and has two very large round trees on the edge of the shore. A conspicuous gable-shaped hill rises in the distant range of mountains, with a bluff east and west of it; the centre of the gable or barn bears from this, Cape Gosseyn is the eastern boundary of the Deabees; to the eastward also lies the territory of the Wyadees.

The coast between Gosseyn and Bel Haff forms a deep bay, in which the villages of Ayn-bah-Marbaat and Jowarri are situated, with safe and regular soundings, level near the sea—gradually ascending inland.

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From this view the hills in the background are marked with precipitous bluffs,—in fact, a miserable wilderness of elevated land is all that presents itself here. Two green spots nevertheless are left to recall the weary spirit to a hope for change, and remind one of the bad taste of those Bedouins who are contented to fix their habitations on such a barren waste, when at no great distance from them they might revel in the luxury of verdant dales, or ascend to more lovely and moderate heights like the comparative paradise;—near Nakah-el-Hajar especially, when the countless changes they make in the year must give them an opportunity to feel the pleasure of avoiding the glaring heat of the sun.

AYN-BAH-MARBAAT, a village situated on the Sand Downs, a few miles inland. The population is computed at 130; it contains about 100 huts and a small round mosque, deriving the appellation of Ayn (a fountain) from the spring of excellent water in its vicinity. Jowaree and date-groves are carefully cultivated by the inhabitants. The mosque bears from the Tower of Bel Haff, N. 63° 40′ W.

AYN JOWAREE, a village about half a mile inland, in the same direction as Ayn-bah-Marbaat, thinly populated, with seventy or eighty huts surrounded by patches of cultivated ground; date trees and springs of water are also very abundant.

GILLAH, a fishing village N. W. of Bel Haff, in the possession of fifty or sixty abject-looking Buddass sheiks, who are permitted to live quietly and unmolested by any change or duty, owing to the sanctity of their descent. I saw about twenty miserable sheds belonging to them, and upon the whole this place has nothing whatever to recommend it, farther than as an inhabited village on the coast.

RAS-EL-ASEEDAH, the eastern cape of the deep bay of Ayn-bah-Marbaat; it is very conspicuous from having a dark rocky conical hill at its extremity, 160 feet high, and plainly discernible at the distance of five or six miles on a clear-day. This elevation is named the Hay-cock, in lat. 13° 57′, long. 48° 15′ 20″ E., by trigonometric measurement, agreeing within a few seconds with chronometric.* Three points project from Cape-el-Aseedah.

BEL HAFF—The westerly forms the southern side for good anchorage against easterly winds, and as a shelter during the N. E. monsoon.

* Lieut. Welsted has published its position in long. 46¾ E.; how he imagined it to be so I cannot conceive.

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This little bay may be considered a snug resort, a vessel may lie close in shore with the water as smooth as a mill-pond, (too much so to be universally agreeable); one circumstance, however, I would mention—while comfortably settled here the wind might suddenly chop round to the south-west: this seldom occurs with a breeze strong enough to render a ship's position dangerous. It is simply an event to be borne in mind, lest one should be surprised from a pleasant berth. The wind from November to May (on this part of the coast) blowing hard, is invariable from E. S. E. to E. N. E., and at the change of moon regular land and sea breezes may be experienced. From the eastward it comes off the point of El Aseedah in strong gusts; the only apprehension would be lest the vessel should kedge off the bank into deep water. I was a perfect stranger when I anchored the *Palinurus* within 350 yards of the nearest rocky point, in 15 fathoms, and after veering away chain for 60, my gangway was in 23, which proved the sudden declivity of the bank. Having trigonometrically surveyed Bel Haff, I may be allowed to suggest the following bearings:—

The bottom is entirely free from rocks; notwithstanding the commander of a vessel must be careful not to stand far to the N. N. W., as a shoal bank of rocks and sand extends in a straight direction for some distance off shore.

With a strong easterly breeze, this point should be rounded 300 or 400 yards from it, in the first place reducing sail, in order to make a vessel snug to receive the gusts of wind which frequently blow with considerable violence; immediately after rounding, when off the point, steer so as to keep a black barrel hill about a point in the starboard bow. This anchorage has the island of Hassan Ghorab to the eastward, the Sand Downs of Ayn-bah-Marbaat to the N. W., with the conical hill on the verge of its extremity, there is consequently very little chance of mistaking it. Bel Haff is thus called in commemoration of a Sheik, whose burial-place is contiguous. In the centre of this small bay stands a square and rudely constructed tower, garrisoned by one or two soldiers in the pay of Sultan Abdul Wahidi (chieftain of the Wahidi tribe;) at the time of my visit the principal employment of this guard appeared to be in collecting the trifling port-dues, and superintending the arrival of cargoes, principally consisting of coffee, cloths, and coarse silks exported from Maculla, Shahah, Aden and Bir

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Hamed. Howath (the supervisor of these transactions) behaved most courteously towards our party, and explained the methodical manner with which his duties are conducted; upon the immediate arrival of any bedans or ganjahs (boats) bringing merchandise, camels are saddled with a kind of bamboo pannier serving to transport the goods very conveniently to the inland towns, from whence they return to Bel Haff laden with skins of water, which are emptied immediately into a small reservoir in the interior of the tower built expressly for the purpose of preserving it in good condition. There is no fresh water in the neighbourhood of the place, and only a sufficient quantity brought to meet the consumption of the few persons generally residing here. Between Ras el Aseedah and Hassan Ghorab the coast is continually irregular, with rocky jutting points and small intervening bays, until you reach

Ras Ruttle, a remarkable round cape of volcanic origin; it is considerably elevated, with a deep hollow (similar to the mouth of a crater) in the centre of it. At a distance the summit bears a round appearance, with a singularly dark fringed covering around its whole exterior, occasioned by a quantity of black shades passing over a light ground. On each side of Ras Ruttle there is a bay for small boats: I anchored in the western one, close in shore, but I would not advise other vessels of any size to do the same.

The next object worthy of particular notice is the brown hill of

Hassan Ghorab, the site of the ancient Cana Canaan, and formerly one of the most important places on the Arabian coast. It is a square dreary mountain of 456 feet in height, with very steep sides. The late Dr. Hulton and Mr. J. Smith discovered (in the course of their indefatigable and successful rambles) that a narrow pathway cut in the rock led to the summit, and as no difficulty ever deterred them from pursuing an object attended by the remotest prospect of accomplishment, they forthwith climbed the weary way, and found thereby the ruin I have before compared with that of Nakab-el-Hajar; much time and strength must indeed have been expended in the laborious undertaking of this road, in some parts nearly ten feet broad.

On the second visit they effected a more minute examination, measuring and drawing plans of each separate ruin. It was here that the inscriptions resembling those of Nakab-el-Hajar were discovered,

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carved in the solid rock (first considerably smoothed) and from whence they were copied by Dr. Hulton; he described them as being but slightly injured by the lapse of years, and not one character seemed effaced; the tanks, together with the ruins of several walls, were composed of cement, as hard and impenetrable as the rock itself. For a plan I am indebted to Lieut. Sanders, who afterwards (owing to the illness of Lieut. Wellsted) became Assistant Surveyor;—a vault of a curious description was also discovered. I will not attempt to draw any final conclusions regarding the period in which a city flourished here, nor venture an opinion concerning the supposed unknown character of the writings (a copy having been sent to those so competent to pronounce a correct decision upon them,) farther than to relate some traditionary accounts credited by the Arabs. They say that this spot was originally peopled by a tribe called Sumharmas (the descendants of whom still dwell near Maculla,) and that of Wadee Messenah (to the westward of Syhoot;) the former constitute a separate and distinct tribe, now bearing the name of Beni Saiban, who have insensibly become incorporated, and many of them will be found dispersed among other nations. The Wadee Messenah still retain their desolate but exclusive lives, and are known by the opprobrious epithet of Habeed Hybad (or the Slaves of Somanlees.) This appellation arose from their assimilation with the slaves of Africa.

On the N. E. side of the African continent there is a district called Samhar, containing the populous towns of Nukdusha and Juba, bordering the river of that name, known by the natives of Brava as Wowenda.

This river rises (it is said) in Abyssinia, and is sufficiently spacious to navigate small boats to a distance occupying the space of three months; this computation would bring one close to the Mountains of the Moon, from whence the Nile doubtless draws her chief supply, and from whence it is also probable the Suba derives its source. The language of the people inhabiting these towns is wholly unlike the Sowaluglee spoken in Zanzibar, and it will be remembered that when the Portuguese took possession of this coast, in the fifteen century, they found the villages, &c., from Nukdusha to Sufala, governed by Mahomedans, differing (in every particular of dialect, person and character) from either the Arabs or Africans. The causes which have led to so evident a dissimilitude in people who occupy almost the same spot of land, must be

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determined by those more deeply learned in the lore of ancient history. One thing appears certain, there was an established facility of intercourse with Abyssinia, and since the tide of population from this part of the world flowed down the Suba, and there exists an affinity between the languages, the presumptive intimacy of the two nations acquires double weight; yet probably a clue might thus be traced to elucidate the name and origin of the tribe who are said to have occupied this station, and then proceed towards solving the mysteries recently mentioned. In whatever time the buildings around Hassan Ghorab were erected, I consider the present discovery of great importance. The Fort having unquestionably been intended by the former to protect the harbour on its eastern side, independently of the town beneath, which (judging from the size and extent of the ruins,) must have been considerable. Its position, too, equally served to render it a sea-port of immense consequence, and the citadel on the hill the grand depot for its commercial resources.

Bunder Hassan Ghorab, a small, secure, and well-sheltered bay and harbour to the Eastward of the Black Hill of Hassan Ghorab. This rock forms its S. W. point, from which to that at the entrance it is one mile and a half broad, and one deep. Its eastern side having a rocky reef off it, reduces the clear channel to rather more than three-quarters of a nautical mile, or 1710 yards. For this there could not be found a better guide than in observing the following simple rule: a vessel may pass close to the high precipitous rock of Hassan Ghorab, with the westward point of the reef (forming the eastern side of the entrance,) exactly due north, and distant about 1610 yards from the square tower, or home of Bier Ali. Situated at the bottom of this bay there are several adjoining hamlets, containing perhaps each fifty Wahidis. Bier Ali is so called from the well near the village, and becomes a prominent object from seaward.

A vessel approaching from the southward and westward, rounding Hallanee Island in 8 and 9 fathoms, may stand right in for the square house above alluded to, with the bearing between N. 15° E. and N. 27° E. true, on the line, anchor in four fathom low water, from 400 to 600 yards off shore; great attention should be given here so that the house may not be brought to the northward of N. 11° E. true, as a small reef projects about 590 yards.

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In coming from the eastward also, a vessel should not advance under 12 fathoms (which is a good depth to pass the eastern point of the bay in,) with the square house bearing according to my proposed plan. She may then stand in, and anchor with the house N. 24° E. true, which is near a transit line to the outer edge of Hallanee, distant a quarter of a mile off shore; during the S. W. monsoon she can run in more to the westward, so as to bring the mountain of Hassan Ghorab nearly south of her. The soundings in this bay are generally of clear sand, with an occasional patch within the harbour; there is no danger on the western side, but the sounding may be relied on as a guide. The square tower, or house of Bier Ali, is in lat. 14° 2′ long., 48,° 25′ 20″ East.

HALLANEE ISLAND, a rocky plain situated to the S. S. W. of Gibul Hassan Ghorab, only separated from it by a narrow shoal channel, with 1 and 1½ fathoms in it; this island is three-quarters of a mile in length north and south, and half a mile east and west; several rocky points project from it, with a sandy one on its north-west end: Hallanee is composed of limestone. Between its western side and Ras Muffraudda a vessel will find tolerable shelter from E. and N. E. winds. The soundings in the centre are on a transit line from the cape to the southward end of the island, being fourteen fathoms, decreasing as you approach the shore from either way, thus a vessel is able to take up any position according to circumstances.

Immediately to the eastward of Hassan Ghorab, bearing from Sekal Island N. 8 W. true, and N. N. W. of the highest peak of Guthrain Island, stands a mountain which might not attract the attention of a passing observer, yet upon enquiry and examination we found abundant to interest our curiosity.

The name of this singular height is Shaarran; imagine a circular mountain composed of sandstone, situated about one mile from the sea, and 300 feet above its level, with a table top, the centre of which is completely hollow, similar to the Devil's Punch Bowl in Hampshire, except that it is more considerable in every way,—the circular edge sharp with a steep descent on both sides, having its lower surface covered with water, and romantically overhung by a beautiful bank of mangrove-trees. The diameter of the bowl we imagined to be 2,000 or 3,000 yards—by a rifle shot I fired, which flew about half way across, but I am still

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quite uncertain as to its depth; we certainly had many doubts upon the subject, and unfortunately could not accomplish an accurate calculation, as we had no canon, or even wood of any kind, with us to contrive a catamaran, and by this means have measured its centre; we, however, ascertained by throwing out the boat line with a float, that at eight yards distance from its western bank the water's depth was sixty-six feet, on the S. W. forty-two feet, forty from the brink, and on the S. E. twenty feet, and thirty from the middle edge. The natives of Mugdha assert that it has no bottom whatever (rather an extravagant idea.) The water was very salt, and of a greenish colour; on analyzing the pool water I found it to contain a quantity of sulphurated hydrogen. This remarkable sheet of water is designated

KURREEF SHAARRAN.—I had heard several very strange accounts of a sea on the summit of a mountain, yet I did not expect to discover so extraordinary a phenomenon as that I have just mentioned. It is about six miles from Mugdha, and I was proceeding on my way to Mocha, when it struck me that I could possibly make some interesting discovery by enquiring the exact position of this much-dreaded hill; consequently, directing the *Palinurus* to weigh when the breeze set in, I left her (accompanied by Lieut. Sanders and Dr. Hulton) in the quarter boat at 4 A. M., and arrived at Raskhada at 8 A. M.; my party did not seem much affected by the ghostly enemies who are said to inhabit this cavity, nor did we suffer a visitation from the goblin sprite presiding over the mangrove-trees. The heat, however, was insupportably excessive, creating the most horrible feelings of suffocation, particularly on the inside of the mountain, and the superstitious natives were disposed to form very uncharitable opinions when they perceived our anxiety to become acquainted with every minute circumstance of this fearful spot; the soil between the mountain and the sea consists of sand, and nearer towards the beach it is one perfect rock. While standing on the verge of the boat, we were greatly delighted by the sublimity of the surrounding prospect—tremendous heights, with their valleys blooming beneath the grand blue ocean, thrown open before them, then the solemn suddenness of the change to that deep dark water of Kurreef Shaarran, awed, while it transported us; but since I have only undertaken to relate the more useful part of its history, I will pass over the pleasurable sensations called forth as I contemplated the

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beauties of this wonderful creation. I made a rough sketch of this vast and natural curiosity: it strongly resembles the mouth of a crater, but I do not conceive it to be of volcanic origin. The guides directed our attention to an even plain to the north called the Meedan, and related that on some former occasion a quantity of iron rings and pegs (commonly used to fasten horses) had been found there, with various other relics; but all we could perceive was a circle of stones piled up level with the valley: they, however, patiently endeavoured to excite our adventurous spirits to seek for hidden glories under the heavy mass of sand and stones before us, provided we did not require their assistance. At 11 A. M. we returned completely satisfied with the trip, and classing it among the most interesting of our inland journeys. The climate appears to be very unhealthy in this neighbourhood,—hot enough to annihilate an Englishman, and well nigh sufficiently so to melt the hard and impervious craniums of the natives.

GUTHRAN ISLAND, or Rocks (the highest peak of which bears from Sekah nearly true north;) one large and two lesser rocks will be found at a short distance from each other, the channel between the first and last is perfectly safe but narrow, having 300 yards with 12 fathoms in it—between the two small ones it is almost dry at low water. Another channel passes through them and Ras Khada (a slightly projecting rock on the main) which is frequently used by boats, having seven and eight fathoms deep water on the island side.

SEKAH, or GIBBOOSE, a small island bearing from Magda village S. 36, 30, 10 W. miles, in lat. 13° 54′ 40″ N., long. 58° 28′ 20″ E. It is called Sekah by the inhabitants of this coast, and Gibboose by Arab navigators from its outline resembling the katar (a musical instrument of Indians). The most elevated part to the eastward is 400 or 500 feet above the sea, and is plainly discernible at the distance of thirty or thirty-five miles in clear weather; the summit is smooth and white, owing to the numerous flights of birds which resort thither and quickly form the excrement, constantly providing this singular article of trade, which is purchased at a high price by agriculturists. A vessel may pass in any direction to or from this island without the slightest apprehension of danger, yet I would not approach within 300 yards, having twenty fathoms all around. Between it and Burrugghur there are soundings of twenty and twenty-three fathoms then again between

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Sekan, and the Guthrain rocks the same; and deeper between the island and Hallamee, and to the southward ninety-five fathoms one mile and three-quarters off it.

BURRUGGHUR ISLAND is small, precipitous and very lofty, principally formed of limestone, with not a vestige of vegetation on it, in lat. 13° 58′ N., long. 48° 32′ 40″ E. When running along the coast it has frequently been mistaken for a point of the mainland; it, is nevertheless separated by a channel through which the *Palinurus* ran with a fair wind, and now called Sanders' Channel, from the officer who first sounded it.

MUGDHA VILLAGE AND BAY, a very excellent anchorage from the easterly monsoon, formed by Ras Mugdha to the east (a dark moderately elevated cape to the north of Burrugghur and the northside of Sanders' channel, to the westward by Ras Khoda and the Guthrain Islands.) The only danger to guard against in this bay is occasioned by the sunken rock about half a mile off shore on the N. W. side, immediately between the two pieces of table-land. In any other part a vessel may choose her most convenient depth.

Mugdha Village consists of one mud and stone building, a mosque and a few cadjan huts; its population amounts to fifty or sixty; all this place afforded in the shape of supplies during my visit in 1834, comprised the following stock: two goats, two sheep, one cock and two hens, and the water extremely indifferent.—The Sultan of Magdain notwithstanding makes the mud building his principal residence. This chief, Mahomed ben Booleekur, is subservient and tributary to Abdul Wahidi (Sultan of the Wahidis), and although the nominal power and right of the former extends from Meyfah to Bel Haff and the islands off the coast, he is not permitted to claim either influence or property beyond the limits of the nearest mountains. The Dewhaidees (a small sub-division of the Wahidis) are under his direction, and upon any emergency 200 or 300 men are at his disposal; thus his power is sometimes of infinite assistance to his haughty kinsman, for notwithstanding the smallness of the number, their athletic and robust stature cause them to present no insignificant foes to the presumptive adversary. The annual revenue of this territory is of course exceedingly trivial, the greatest sum being derived from the sale of birds' excrement (a singular traffic for the cares of majesty)

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it however adds 100 dollars to his yearly receipts. Three boats are employed for the purpose of collecting this, in one of which (a gangah, or buggaloe) his cousin Sallah ben Abdullah constantly trades, occasionally crossing to India. The result of his industry is sold at Makallah and Shallah.

The inhabitants of Mugdha are wholly dependent upon other ports for food; rice and jowaree are brought to them from Aden and Makallah, dates from Hurgiah, and every other commodity from various places along the coast and villages inland. The Sultan is a pleasing good-natured man, standing about five feet eight inches high, powerfully made, and walks extremely erect, possesses a most sonorous voice, with a mild and agreeable deportment. He did me the honor of a return visit on board, and expressed himself highly delighted with the comfort and convenience of a ship; never having seen a square-rigged vessel before, except when passing along the coast, his surprise was unbounded, and appeared to exceed all the sagacious ideas which had been gaining belief in his imagination, and which (by this certain demonstration) seemed completely overturned. I took him into my private cabin as soon as the first excess of amazement had ceased, when he became still more pleased with the arrangement, and more particularly attracted by the weapons hung around, the sides of the cabin being ornamented with guns, swords, &c., collected from different parts of Arabia, Persia, Africa, India and China; and after having contemplated the whole for some few minutes he exclaimed, "Well, this is the best house I ever beheld." I was rather surprised to find him too polite to request any gift from among the decorations of the *Palinurus*, for one is generally assailed with great perseverance when any special object calls forth the admiration of these savage princes. Mahomed ben Booleekur, let it be said to his credit, neither asked for, or seemed to solicit by his admiration, the most trifling of the strange things he observed, but departed accompanied by the kind feelings and best wishes of those who had made his acquaintance. His cousins are not nearly so handsome as himself; their names I believe are, Hamed ben Maaisa, Menif ben Nassah, and Sallah ben Abdullah, who will probably receive his kingdom in succession.

HARGIAH, a town under the sheikdom of Daan, distance two days' journey from Mugdha, and from whence the people of that village are

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supplied with dates, &c. It is situated between the southward and second range of the Wahidi mountains; the population amounts to 3,000, and it is generally considered a fertile and flourishing country, abounding in cultivation, with a considerable portion of good pasture land, and innumerable date groves: the immense herds of cattle these people possess enable them to export large quantities of ghee, &c.

SANDERS' CHANNEL, running between Barrugghur Island and Ras Mugdha, about one mile broad, with fifteen, sixteen, and seventeen fathoms in the centre, sixteen fathoms in approaching from eastward, and twenty-five from westward, perfectly safe.

RAS KHELB, in lat. 14° 14′ 0″ N., long. 48° 46′ 50″ E. The shore here is low and sandy, occasionally sprinkled with jungle, but takes so completely convex a shape as to render it one of the most prominent and hazardous capes on the coast, and is thus named owing to its fatal point, on which so many boats and buggaloes have been wrecked and lost when coming towards it from Ras Mugdha on the western side, or Ras Rehmat, on the eastern; it presents a very abrupt and irregular projection; the soundings reach to a considerable distance, giving sufficient warning to a vessel in approach. I would not, however, advise a navigator to round it close at night, as it is then scarcely discernible (without a moon a person should on no account attempt to do so;) it is particularly unsafe at all times, and also ought to be avoided in hazy weather by keeping far out to sea. After passing Ras Khelb, the coast becomes wretchedly waste and sombre in appearance. Sand-hills and hillocks extend inland for many miles, and the far off mountains of limestone seem more dismal in their distance, without one blade of grassy verdure to enliven the cheerless view. The summits of the hills in the interior are very uneven, shaping into peaks, bluffs, &c., with almost perpendicular sides of 3,000 and 4,000 feet elevation. The country is very thinly populated; a few fishermen were the only living objects we discovered in this desolation, and they had apparently just hauled up their five or six little boats in anticipation of a rest after the labours of the day. The women were busily employed (in cooking, dressing, and arranging their ornaments) in the most inconvenient huts, but which I dare say answer the purpose of sheltering them from the scorching rays of a sun that shone above them in all the fierceness a sandy desert seems to give it. About three miles off shore this low

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line of coast is neither difficult or dangerous, having thirty and forty fathoms till south of Ras Khelb, when the soundings become more extensive, and a vessel may suddenly find herself in fifty fathoms six miles from the beach.

Ras Rehmat, the next high cape, of a dark peaked outline, composed of limestone, and extremely elevated; on its S. W. side the sand from the barren plain between it and Mugdha has been thrown up into one immense heap by the violent strength of the S. W. monsoon: gaining its appellation from the severe effects experienced by Arab buggaloes in running up during the tadhbireh from seaward, this part is very remarkable, being the commencement of the bold dark and precipitous land extending within fifteen miles of Wakallah. Ras Rehmat bounds the eastern extent of the Wahidi territories.

The Wahidi tribe, consisting of several thousands reduced into subdivisions, separately governed by subordinate chiefs, subjects of the Grand Sultan, who regulates the whole body unbiassed by the influence of any assisting legislator, and indeed he conducts his kingdom with the nicest regularity and success, administering judgment in his own person, and holding supreme command over every department. The only monopoly I perceived was that which it would puzzle his national character to refrain from—*id est*, a tithe and portion of all that undoubtedly belongs to another; but custom reconciles this and many other things in Arabia. These people are equally both warriors and agriculturists,—civil and hospitably generous to those strangers who flatter them by familiar kindness, but cunning and revengeful when oppressed. The Grand Sultan, Abdul Wahidi, possesses great influence on account of his noble descent; for, strange as it may appear, genealogy gains its due weight even in the savage wilds of an Asiatic province. This Prince can muster 2,000 matchlocks, and bravely bear his own in time of war; upon the whole he would be rather a fearful enemy for the neighbouring tribes, if either ventured to oppose him. There are but two sea ports in the Wahidi territory, which I have before mentioned under the names of Bel Haff and Hassan Ghorab; the inland towns, however, are very considerable and well populated. Hassan and Meyfah are equal to Makallah in size and number of inhabitants.

Goobul Goolloon, a small bay situated to the S. W. of Ras Burum, in lat. 14° 16′ 30″ N., long. 49° 2′ E.; the anchorage is very

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indifferent, but about a quarter of a mile off shore you are clear of every danger, passing the steep bluff on the south side of the bay; low land continues as far as El Rahmah (another bluff four miles beyond Goobul Goolloon,) this last is of a reddish cast, from which circumstance it derives its name, thence to the westward it forms a second bluff, with regular soundings, having for its S. W. extremity, a range of dark and lofty hills, particularly rugged and craggy, terminating in a low point, which has the peak of Ras Assasah nearly on its verge. One mile from the shore the depth is from 20 to 30 fathoms; it is nevertheless dangerous to venture too close in. We met a little savage community assembled near a small hill in the centre of the bay, amounting to perhaps 30 or 40 people—lank, miserable looking men, women, and children, who endeavoured to shun our acquaintance by concealing themselves among the rocks, the incavations of which afford them house room.

Leaving Ras Assasah (a small projecting rock to the S. W.) the same gloomy and mountainous land alternately presents itself, but soundings extend the whole way from Rehmat, having 2 and 3 fathoms within 300 yards of the beach when sailing past Assasah. A gap in the mountain affords a view of Al Ghaidhar, a large town romantically embosomed in luxuriant date groves, four miles inland from this cape.

Ras Burum, in lat. 14° 18′ 30″ N., long. 49° 3′ 25″ E., is a bold, dark, and craggy cape, the highest part of which I have seen when 38 miles distant; it makes the S. S. W. point from Makallah Bay, and the S. S. E. of this bay, or Ras Burum; a great portion of it is composed of limestone,—a reef begins at its extreme edge reaching about 400 yards to the eastward.

Bander Burum, a safe and secure anchorage during the violence of the S. W. monsoon, but open to the E. and N. Easterly winds; it is formed by the bluff point of Radham, and the low point of Burum; should the wind be westerly I would recommend a vessel to anchor in 5 or 6 fathoms, the town of Burum bearing N. E.

The village or town of Burum is in lat. 14° 20′ N., long. 49° 2′ E., laying immediately under a mountain and completely encompassed by date trees. In 1835 its population amounted to 4,000 or 5,000. The houses, huts, &c., are wretchedly built, some of mud and

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stone, others of cadjan, but all are most uncomfortable in appearance. I anchored in the Bay of Burum in the N. E. monsoon, and during the survey supplied my vessel with wood and excellent water, sheep, fowls, eggs, onions, pumpkins, and various little trifles. The inhabitants behaved remarkably well to us, and the Sheikh offered to ensure the safety and comfort of my officer, whom I wished to explore the interior. This village, with that of Fuwah, in the large bay of Makallah along the coast from Rehmut, is under the Sheikhdom of Mohammed Safali, (chief of the Berishi tribe), who possesses a vast district inland, together with the towns of Al Ghaidhar, Ernee, and Ouruba, also the lesser tribes of Akbarree, Hasemeer, Mohamedee, and Shoomashee, being all subservient and tributary to him. Mahommed Safali is a sworn ally of the Nakib or Chief of Makallah, with whom upon urgent occasions he coalesces, invariably receiving ample remuneration for the service he renders. It is, however, a difficult task to raise an army among these Bedouins, as custom compels one to enlist every soldier by means of a stated bribe, varying according to the ability and prowess of the man. Yet I cannot exactly see why this advanced money should come under the denomination of bribery: when a man bravely undertakes to forsake house, kindred and quiet, why should he not receive a donation of this kind, when our own soldiery are for the most part entrapped by a similar gift? and if the bright and free country of England sanctions such a practice, why mark it as a singular coincidence when met with in the precincts of a savage nation? The Sheikh has five brothers, occupied in offices of trust, and connected with the affairs of his household. I observed several inferior boats of small dimensions lying in the bay, which I believe constitute his whole naval force. Ras Burum, however, is frequently visited by trading vessels, which often remain throughout the S. W. monsoon. Their export and import trade seem to be productive of very little benefit to them, judging from the exuberant delight manifested by the whole concourse upon receiving a few dollars in return for an excellent supply of wood and water.

Ijilli, a white mosque, erected on an eminence a short distance from the beach, can be plainly seen by vessels passing and those in the bay. It was erected by a pious priest, Sheikh Wuli; and if I were allowed to report the singular coincidences of his life as they were gathered from the traditions of these people, I could lengthen,

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but, I fear, not improve the task I have assigned myself in these memoirs; the fact is they most firmly and religiously assert that on the demise of this godly saint he was immediately transported into the glories of the Seventh Heaven, there to wait until proclaimed the Angel of Benevolence. He either has been, or soon is to be, consecrated and installed in this high office, when all such as have supplicated and still implore his kindness and protection, will be rewarded by a snug berth in his kingdom; others, on the contrary, who have lived heedless of, or uncertain in their dependence on him, will be punished according to their several deserts. All good and charitable actions proceed from him. He is also the patron tutelar saint of the village. The valleys inland are rich and beautiful, producing large quantities of jowaree, some spots are perfectly lovely in their scenery, bounded on each majestic side by the purple veined granite rock, 5,000 or 6,000 feet above them. In the cold seasons the tops of these gigantic masses are frequently (I am told) covered with snow, and much too cold for the natives to dwell on. The rains are heavy and continuous in November and December, also during July and August, and I have seen severe showers, lasting for three days together, in April and May. Between the Bluff Ruthum (in lat. 14° 20′ 10″, long. 49° 2′ 35″) and Makallah the coast is low, sandy, and very slightly concave, with high mountains in the background.

Fuwah, a quiet unfrequented town near the sea, containing about 200 houses and 500 inhabitants, an uncourteous timid generation, whose fear evidently betrayed them into the incivility we experienced from them—yet it is scarcely possible to suppose that a people so closely connected with a town like Makallah, where Europeans constantly reside, should evince such a hatred to a white man,—some of the *Palinurus* officers were absolutely insulted during a ramble among the valleys. This conduct is more surprising when we recollect they are constant visitors at the Makallah market, to which they regularly convey a part of the produce of their land—jowaree, vegetables, &c. &c. The terror and alarm displayed by the inhabitants when my vessel anchored of Fuwah, surpassed any fear I had ever before witnessed among the most remote and uncivilized barbarians. All along this low shore the soundings continue pretty good, becoming more steep as they extend towards Makallah.

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MAKALLAH, the principal commercial depot on the coast of Arabia. This town is constructed on a narrow rocky point projecting about half a mile into the sea, with a bay on each side of it; the Nakib's house, in lat. 14° 30′ 40″ N., long. 49° 12′ 20″, is situated almost directly beneath a curious and remarkably oblong hill, the circular top of which rises above the summit of a steep cliff commanding a complete view of the town, and on which six square towers have been erected for its protection. The foundation of this singular height, usually called Makallah Hill, is of limestone, and the upper half a beautiful white marble, traversed by grey and blue veins; its surface has a light sandy tinge, and can be seen from the distance of forty-two miles; to the north and west of the largest, or the Nakib's house, the place is strewn with cadjan huts and stone buildings erected within the last two or three years; these are built on a sloping ground from the base of the cliffs; from the westward of these to the water's edge a dilapidated wall extends, having but one entrance gate which is constantly guarded by a few Bedouins. The principal portion of the Makallians dwell here, amounting perhaps to four or five thousand souls, forming a motley collection of the Beni Hasan and Yafa-i tribes, Karachies, and Banians intermixed with foreigners from all parts of the world. In 1834, when I first surveyed the Bay of Makallah, an imbecile old man held the office and state of Nakib or Chief, and I suspect he had almost the annals of a century within his own particular experience; be that as it may, the following year announced a new aspirant to the important Government he had been compelled to vacate, owing to his infirmities and unfitness to regulate its duties. His son and nephew for a long time disputed the chieftaincy, and (as usual in such quarrels) a war resulted. This notwithstanding was of short duration; a few musket shots and matchlock balls decided the events of the day, and the nephew by mutual assent took possession of the office granting absolute power and authority over the dominions of his uncle. This triumphant victory was obtained by the assistance of the Sheik Shahab, whose machinations and intrigue at length succeeded in gaining over the superstitious to the cause he had espoused, when Mohammed ben Abdu-l-Abid (nephew) forthwith took upon himself the governorship, granting a stipulated income to his uncle and family. After this unjust treaty, by which the rightful heir was

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superseded, a mutual hatred between the cousins soon became too apparent for their ceaseless anxiety to disguise it, and the death of Abdul Rhul (the uncle, and original founder of Makallah) happening just at the crisis when their vindictive spirits had fairly ignited—an universal revolution was the consequence. This lasted for several days, during which time both nephew and son were closely guarded within their respective fortifications, leaving their slaves and adherents to fight the battle for them, firing into each other's windows, assailing the doors, and at last Mohammed ben Abdul Abid succeeded in besieging the unlucky son, who finding his case grow momentarily more hopeless, in competition with the well-supplied purse of his cousin, which was profusely distributed in obtaining all the assistance necessary to crush the subdued—once more relinquished his arms, and yielded his right to the office of Sultan, merely requiring the small pittance of six dollars per diem for the support of his whole establishment (which is certainly rather a considerable progeny for one lord), and for his brother and family the daily sum of three dollars. These events occurred in the year 1835, thus concluding the title of usurpation by which the present Nakib Mohammed ben Abdul Abid quietly obtained the Government of Makallah. Such constant turmoil, however, brought with it a long train of evils that could not so easily be dispelled, and it required the most attentive and prudent caution to replace the commerce of the town on the same solid and secure basis whereon it had proudly stood during many long and flourishing years. The trade had imperfectly dwindled away into comparative insignificance, many of its principal merchants had quitted in disgust at the tyranny of the usurper. Notwithstanding the unsanctionable terms of the chief's accession, he nevertheless quickly evinced his ability to execute the duties of this station; and with infinite tact and assurance commencing the first reformation in those affairs which needed immediate assistance—changing the tide of fortune so rapidly and materially that the merchants were induced to return, and in 1836 this new system had completely re-organized the whole body of the inhabitants. He bought the vessels of poor and reduced owners at a high price, employed the idle and neglected in building others, making new huts for themselves, and, in fact, completely succeeded in restoring the commercial interests that his unpardonable seizure of the chieftaincy had destroyed.

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I had several opportunities of forming an acquaintance whith this singular man, but my visits were generally of an unsatisfactory nature. Being deputed by the Bombay Government to require his attention to some question concerning money—a matter which seemed absolutely hateful to him—during one of our interviews, he expressed his intention to increase his present defences and build a fort about one mile further to the westward, in order to extend the limit of his town so far. Many of the stone houses are three stories high, and the only difference I could perceive in that of the Nakib's to a private individual's was in the roof, which was ornamented by a square building very much raised above the other rooms, enclosing a delightfully cool little chamber, exclusively appropriated to the siesta of the chief and the ladies of his seraglio; a flag-staff is also built on the top of this tower. They only who have climbed the height leading to the mystic sanctum can give any idea of the variety of perfumes and fragrant zephyrs breathing as they pass through the dirty dark recesses and narrow broken staircase leading to the audience hall; and however agreeable these powerful odours may be to the olfactory organs of the Arabs, certainly Europeans must condemn them. Without exception, in no part of our universe is cleanliness so little observed or appreciated as in Arabia. As soon as a person enters the room—usually furnished with two or three old-fashioned chairs and a collection of curious weapons hung on the walls around—the chief directly proffers him one of each, and after his visitor is seated places himself on a divan or reclining cushion laid on the floor, and disposed so as to rest his back in all the indolence of eastern custom: after receiving and exchanging the usual compliments, coffee is introduced, with coffee husk (called cassia-sherbut) and hooka. Having been thus regaled, and surrounded by the same oppressive symptoms of a close and dirty house that I before mentioned, mutual salaams again permit the guest to descend, and how truly does he thank heaven for its pure atmosphere, when the last door of the Nakib's palace leads to the unclosed space before him. Yet he may be pardoned should his memory sometimes revert to the half-opened curtain unveiling the large eye and long-lashed beauty of the Said that so slily droops upon it, and disappoints him of his continued gaze when his step, view, or uncommon appearance have tempted the dark sirens of the harem to steal one secret glance at the stranger.

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The principal import and export trade of Makallah, consists of the following :—

From Bombay and the Malabar Coast.....	Rice, cotton, cloths, lead, cocoa-nut, iron, crockery, cottons, and cardamoms.
Mocha.....	Coffee.
Muscat.....	Dried fruits, Dates.
Aden.....	Jowaree, Badgeree, Honey.

Berbura, Bander Gassin, and other Abyssinian ports, sent from thence to Bombay.	Sheep. Honey. Slaves, male & female. Frankincense. Aloes. Coffee. Dye.

A considerable and profitable trade is also carried on with the people on their own coast of Arabia, and the different vessels passing to and from the Persian Gulf and the Red Sea, which remain, according to the custom of Arab sailors, a few days to rest, after being a short time at sea. The anchorage fee is but seldom obtained from these boats ; were they generally to pay, it would make a tolerable addition to the Government receipts. As I have often observed, perhaps twenty or thirty a day arrive, and many of 100 to 300 tons burden with goods, others with pilgrims,—the greatest number arrive during the date season.

The custom-duties are five per cent. upon Indian produce, or other goods from India and Cutch. Vessels are charged anchorage fees of five, ten and fifteen dollars, according to size ; but Arabs will scarcely ever submit to the demand, considering themselves exempted from such taxes in the Red Sea, and in those harbours which confine its limits. The opinion they maintain is this, "Are we not all Ben-i-Adam (sons of Adam), and have we not equal rights in the kingdom he bequeathed us ?"—thus do they avoid any contribution towards conveniences by which they profit, unless actually constrained to do so. Slavery is considered so universal a benefit that the duties levied on the sale of males or females is very trifling ; consequently great numbers are imported and sold upon inspection,—a market for the latter purpose is daily kept up, where a person may see hundreds of these wretched creatures linked together, and when thus exhibited the highest bidder first surveys the lot knocked down to him, and if satisfied with his bargain drives away the miserable slaves, either choosing the females for his harem, or any other occupation ; but if, however, the lady does not precisely answer his object, whatever it may be, she is returned to the sale for another chance, and a per centage deducted from the price originally paid,

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owing to her disqualification. I have seen young women in the freshness of youth and beauty, and perfect symmetry of figure, sold at the rate of from 20 to 100 dollars; and in those parts of the Arabian coast under the immediate influence of the Egyptians, this horrid traffic flourishes to a more disgusting excess than even here. I have witnessed the incredible number of 700 females, from Habashee and Nubia, on a platform in the market place, and quickly purchased after the necessary ordeal of examination, owing to their blooming loveliness. It is a most repugnant spectacle, but too common amongst these people, that upon expressing the least symptom of disgust or abhorrence, they seem perfectly unable to understand what is meant, and rather feel surprised that one does not enter into their admiration of shape, feature, &c., in the doomed wretches before them. Previous to the day of sale the poor creatures are driven for water (like a flock of sheep), morning and evening, to a well at some distance from the town, and regularly fed upon one jowaree cake per diem each,—a sad and sorry pittance, plainly proclaimed in the protruding bones of the miserable slaves; a dried leaf or small mat formed the only covering to figures and features of great elegance. Their ages varied from seven to eighteen, averaging from about 30 to 100 dollars ahead.

The duties of Makallah in 1834 amounted to 3,900 dollars, but in 1836, under the Government of its present chief, they were increased to 6,000, exclusive of those set apart for the maintenance of his cousin's families, the senior members of which are seldom visible except on Fridays, when proceeding to mosque. Since their abasement of fortune they have maintained a dignified retirement within the confined limits of their especial domains, whilst the goodnatured object of the chief appears to be in gradually lessening the small property of their incomes. Nakib Mohammed ben Abdul Abib, is of the Hassaidee tribe, which together with subdivisions from those, the Makallians, Hakawbuch ben Hussun, Haeg Jowasha, Bahamee Bowhaisha at present occupy Makallah.

The Mahomedan religion is strictly observed here, but of course the native population becoming daily so mixed up with visitors and strangers, even the awful rigour of the law fails to prevent constant scenes of riot and debauchery that occur. The Nakib has added almost cruelty to regulations which must have ever been considered unwontedly severe, and many instances of his arbitrary judgments hap-

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pened during my visit. The first was a case of extreme interest to a foreigner, and to one who has learned to view such things with less horror from the inordinate levity of other countries through which he recently passed; but to my history.—A young and beautiful wife had reluctantly yielded a listening ear to the warm and pressing solicitations of her persevering lover, when unlucky fate, refusing to protect the deluded pair, discovered them to her wrathful husband, who forthwith led them to the tribunal of the chief. The poor girl was in consequence flogged most barbarously, and afterwards suffered the horrible punishment of having her ears and nose slit open with a sharp knife; and even yet, to satisfy the stern chief, she was publicly stripped and turned away: but whether the groans of pity or hisses of condemnation preponderated here, I cannot justly say—suffice it, that the crime seldom offers an opportunity for the enforcement of this gross torture, by the unfrequency of its occurrence. The lover (fortunately for him) being the son of an influential merchant, was permitted to pass untouched by the general sentence of his country. The circumstance breathes suspiciously of the chief's justness and impartiality; and a second incident did not serve to set forth his character in a purer light,—a slave had been apprehended in the act of theft, the poor wretch was first beaten terribly, his right hand cut off and the stump instantaneously dipped into scalding pitch; yet these people approve the system, and pronounce their Nakib to be a fair and honest judge. So he may be, in condemning or pardoning, but surely his sentences may be less barbarous, and better suiting the greater or lesser evil, whether the culprit be Jew, Pagan, or Mahomedan.

The Banians possess overwhelming influence in trade of all descriptions—superintending, purchasing, and monopolising the cargoes of vessels, &c., which they afterwards sell to other castes at so much per candy, and so on, according to the speculated articles. A ship in want of supplies will find Makallah the very best port on the coast for the purpose of renewing her stock. Persons should be careful to send their own casks on shore for water, as otherwise the people are likely to bring it quite of a brackish taste: it is conveyed to the vessels in skins, which women and donkeys are employed to fill and transport from a well nearly two miles to the west of the town; yet, notwithstanding the trouble of obtaining it, they do not render it ex-

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pensive. The Bay of Makallah may be said to extend to Ras Makallah; owing to the coast between the promontory in which the town is situate projecting from the centre of the large bay just mentioned, causes each side to form a lesser one, the western of which is the general anchorage for boats. This is merely a small nook with one, two and three fathoms, having Makallah to the eastward and a reef to the westward, (nearly dry at low water springs), extending from the shore in a S.S. W. direction to the round point. It bears from the sheik's house, or flagstaff, S. 73 W. The eastern small bay is seldom or never used, owing to a swell which rolls in with considerable violence during the N. E. monsoon, causing a surf on the beach. The bank of anchoring soundings round the Bay of Makallah extends for about half a mile from the shore, until off the low sandy beach running towards Towa, when it increases to nearly one mile.

The great Bay of Makallah (in which are the two smaller ones, known as the Eastern and Western) is sometimes affected by a swell rolling in, when the wind blows strong outside; but, generally speaking, the breeze falls off towards night, and the swell goes down. A vessel can lay here with perfect security during the N. E. monsoon; yet, although it is reported to be the best anchorage for that season, I should unquestionably advise the harbours of Sharma and Aden in preference, as the latter are both considerably smoother. Makallah Bay is nevertheless chosen for the convenience of being nearer the port, from whence supplies of every kind may be readily procured, and more frequent opportunities occur of communication with India, &c. The weather in this bay is exceedingly warm during the middle of the day, and on shore intolerable; occasional land and sea-breezes with slight showers, however, seem to pour a refreshing influence over the scene in the months of October, November, March, and April, and often in June and July; I believe the town is not considered unhealthy for invalids. From my own experience, I should unhesitatingly pronounce the climate to be injurious to Europeans, any detention being invariably followed by intermittent fever among the officers and crew, and to make this more apparent a cruise immediately produced a beautiful change throughout the vessel.

The natives informed me that in the S. W. monsoon the wind blows home with very great force, but always as the sun declines the breeze

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and swell decrease, and that often during the morning it blows strong enough from the N. W. to carry a ship clear out to sea. They tell me also that a vessel with chain cables might ride the monsoon out with safety in the bay, and I think it must certainly be true, otherwise (judging by comparison) one-half of Makallah town would very soon be demolished, as the houses are for the most part erected, in a careless and slatternly style, on a projection which necessarily receives the whole benefit of the S. W. winds, and their inevitable fate must be a general sweep into the waters beneath them, whereas they still quietly retain their separate stations.

Buggaloes are cautiously hauled up on the beach to the westward of the town, or anchored in Bander Burum as the season for the monsoons advance. In 1836 this precaution had been universally observed, without the smallest occasion, for the wind and rain were both extremely moderate; but, on the mountains a few miles inland, the rain descended in vast torrents, and many parts were completely insulated by the immense fall.

While we were at Makallah a capital opportunity occurred of exploring the long-talked-of province of Hadramaut, but the expence attending this journey would have been so great, that I was compelled to give up the idea of doing so, either for my officers or myself. It happened in this way: a very respectable and, I presume, wealthy merchant named Salih ben Abdallah ben Sail had unfortunately received a terrible wound in his arm, and the ball being unextracted occasioned him constant and acute pain; he therefore made his appearance on the coast, fervently hoping that English medical assistance might perchance be otained,—nor was he disappointed, the H. C. vessel *Hugh Lindsay* lay there, having on board a passsenger (Dr. Hughes,) who, with a benevolence worthy of his profession, undertook to perform an operation on the lame limb, and carefully succeeded in taking out the troublesome ball; the gratitude of the sufferer knew no bounds, he felt and expressed himself afterwards in terms of great thankfulness. It was this same person whom I met just on the point of returning to his country, and who unconditionally offered to conduct any of my party to the rich land of his fathers. Being, however, required to forego the satisfaction of observing for ourselves, we derived from him all the information possible.

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In describing the journey he was about to travel, he said it would be requisite to leave Makallah at sunset, then (mounted on camels) reach Tukam the next night about the same time; the tribe here is called Akhabarah, its Chief, Sheik Abdalla ben Gworab. In another twenty-four hours Gibul Akar presents itself, the day after reaching Wasel, held by a subdivision of the Kathardees (the Al Hookum); from thence proceed onwards to a place of considerable extent belonging to the Yakis; on the fifth day arrive at Sa'ah of the Yabari tribe; on the sixth at Abd-al-Beti, inhabited by Al Tatamin Eiwarmas; on the seventh Tarbal, and on the eighth Sihun, both last possessed by the Yaffaees. Allowing the camels to be heavily laden, this calculation would render the distances twenty miles each day, thus making Sihun 150 or 160 miles journey from Makallah, a cossit can accomplish it in four days. The usual computation of the distances from Sihun (the capital of Hadramaut) to the different towns are, I believe as follows:—

From	Sihun	to	Dau'an	36	hours.
"	Ditto	to	Tarim	6	"
"	Ditto	to	Ainat	26	"
"	Ditto	to	Shibam	24	"

The whole province of Hadramaut (of which Sihun and Dau'an the principal towns) is represented in fertilization and richly covered hills. The towns and villages well populated, the palm groves very magnificent, plentiful supplies of water, and indeed every beauty and perfection required to make a paradise of this earth. They manufacture an excellent kind of turban or puggaree, coarse cotton cloths, and silks of dark shades, which colours seem to be most esteemed by them, and I fear, for the same reason that my old acquaintances amongst other Arab tribes prefer them; they are also famous for the manufacture of matchlocks, swords and daggers. At or near Sihun there is a very deep well, to which they assert no bottom can be found, even although it has been several times quite dry. It was built by the Prophet Hond; around this most extravagant well I am also told some characters are carved on a huge stone which cannot be deciphered by their wise men. The appearance of the Hadramaut inhabitants whom I have seen rather pleased me; they were handsome, well formed, and slight men, carrying their matchlocks and creeses (ornamented with gold and silver) in a girdle of silk or cotton. Their dress usually consisted of a dark

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striped turban with a glazed cloth loose coat, over which a neatly buttoned jacket is placed, fastened at the neck, the waist being secured by small plaited cords twisted round the body and confining the mantle of dark blue, the end of which is gracefully thrown over the shoulder. The legs from the knee quite bare, their complexion very tawny, and their heads covered with short curled hair.

Possibly the innate suspicion entertained for strangers rendered the manner of these people (excepting of course our own familiar friend) most repulsive and cold, and it is with the utmost difficulty a person can prevail on them to converse on the subject of their country. A person at Makallah wishing to send goods into the interior, pays three dollars for every 500 lbs. weight. Should a Banian accompany the merchandize he pays five dollars for a guard of Bedouins for the first stage, and so on accordingly until he reaches his destination. Indian goods are thus supplied to the people in the interior, who in return provide frankincense, gum, coffee, and a few other articles for export at Makallah.

A reef to the west of the boat anchorage is the only part near the bay where any danger can be said to exist, and the only rocky patch with shallow water will be found off Makallah point;—it is covered by four and a quarter to eight fathoms, and eighteen between it and the cape, which is distant 650 yards, bearing from it N. W. I discovered this while trigonometrically surveying the bay, and subsequently anchored on it as a station sounding. Those Arab navigators who had been accustomed to pass it frequently were not aware of its existence, and when they perceived the vessel positively anchoring would scarcely be persuaded the bank was there.

RAS MAKALLAH, a low neck of land, in lat. 14° 30′ 20,″ long. 49° 14′ 20″. E., projecting from the base of Makallah cliffs in an easterly direction; 4,000 yards between the town and this cape, another point appears, forming the eastern extreme of Ras Makallah, and distant from the town one mile and a half. When at anchor close in here a ruined fort situated on this neck of land is plainly seen. The cliffs over the town generally have a lightish colour, darkening towards the terminating point.

BANDER ROWEINI, a S. W. anchorage formed to the northward of Ras Makallah, and open to the N. E. monsoon. This is merely an ir-

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regular concavity in the coast, having four, five, and six fathoms close in shore, from whence it suddenly shelves into very deep water. Buggaloes shelter here during the S. W. monsoon. Approaching Raghib, a small village N. N. E. of Makallah, a large antique mosque appears, built in commemoration of an extraordinary character who died hereabouts. This shore abounds with fish, and as we gained the village the whole of the inhabitants seemed to be engaged in the occupation of fishermen, catching immense quantities on the rocky shore. The scenery varies from the bold precipitous height to the rugged declivities of the lower sand-hills. To the north and east of Raghib the coast continues flat and barren till it meets the square hills of Dlhubbah; a few rocky edges project occasionally, but the soundings are bold, and safe the whole way. Far inland some beautiful hills enrich the landscape, sprinkled in the foreground with villages and groves of palm-trees.

Bu Heish is the next town, about three miles distant from Raghib, peopled by the same tribe. It lies in the bosom of a valley, commanding on one side a view of the sea. A line of date-trees surrounds this place, which is rendered still more imposing by the numerous springs of water it contains.

Shehr, once a flourishing town, but now a desolate group of houses and huts. Coming from Bu Heish the old fort is first perceptible in lat. 14° 36′ 30″ N., long. 49° 27′ 35,″ E., very near the village. This spot used to be the seat of government of the Kasaidi tribe, but its chief having removed his residence to a city not far distant, Shehr consequently is now almost deserted. The land in the neighbourhood is partially cultivated, and its population probably numbers three hundred, the great portion of them fishermen.

Suku-el-Basir, a considerable town about four or five miles inland N. W. of the last mentioned village. Its mosques, &c., may be distinctly seen from the sea, and the soil on which it is built,—with that in its vicinity—appears extremely luxuriant. A great quantity of tobacco, and vegetables of many sorts, were easily obtained here, also good dates and the purest water; the people are of cheerful kind dispositions, apparently very industrious, and amount in population to four or five thousand.

Dheba, an oblong table hill, presenting on all sides the same even summit, standing entirely separated from the adjacent mountains,

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and thereby becomes an excellent guide for making Makallah from the eastward. It rises near the sea, into which the point of low land beneath it slightly verges; its N. W. bluff is 36,000 yards from Ras Makallah.

ZAKFAH, a village on the beach a few miles west of Shalah. Mayariyan, a ruined village almost bordering Zakfah, plentifully supplied with fresh water. Shehr, a large town of immense extent (for an Arab town) being upwards of a nautical mile in length, capital of the province of the same name. It is built nearly in the form of an equilateral triangle. The Custom House is the most easterly, but the Sultan's more conspicuous in size. This last is likewise considerably elevated, and fortified at each angle by circular towers. This castle, in lat. 14° 43′ 40″ N., long. 49° 40′ E., may be seen from seaward long before any other object in the town is discernible. The rest of the dwellings are very much scattered, but tolerably capacious and comfortable.

The anchorage off Shehr is an open roadsted, and I would suggest that the best position for a vessel will be found in seven and eight fathoms 1700 yards from the beach. Supplies of vegetables are at all times procurable in the town, although the greater part is brought from the villages, &c., in the interior. Sheep and water are also attainable, but the latter is invariably bad; a few miles inland there is a warm spring of moderate temperature.

YAKALIF, a small hill on which are the remains of a zigzag wall and terrace, situated on the beach, and considered the best mark for making this place. Its highest part being only four and a quarter miles to the E. N. E. of the mosque, so that a vessel has only to stand in with this hill a little on the starboard-bow until the town is visible. I was surprised to find much less sea here during the N. E. monsoon than might be expected from its unsheltered situation.

The population of Buish amounts to 6,000; there are, however, many other towns and villages in this territory named as follows:—

Shelah.	Taballah.	Zaghafah.	Karmee Zahir.
Ghuile.	Wasalat.	Said.	Arif.
Mugghurr.	Dees.	Dauan.	Mayan Abaduh.
Ariyah.	Sewan.	Meyu.	Madu.
Tiklidah.	Arab.	Defaighah.	Ararah.
Karadah.	Buish.	Mugdah.	Musayyid;

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wherefrom the Sultan (Sheikh Ali ben Nargee) is enabled to muster nearly 7,000 matchlocks; 550 slaves are constantly in attendance on his person, while the number of his own relations is quite incredible. This Chief has but one wife (a Nubian girl) and two daughters, of whom he appears to be tenderly fond, several brothers and sisters and a multitude of uncles and cousins. Duties on goods of import and export are levied in the same proportion as those of Makallah, but in consequence of the unrestrained intercourse between this town and other countries, the annual sum total is considerably greater, amounting to nearly 22,000 dollars. The duties consist of anchorage fees, bazar and export taxes, all of which are 6½ per cent; the most opulent merchants are named—Jivas Gheddam; Habbeed Jivas, and Mahomed Salim Muddee; but the Sultan himself enters deeply into traffic of every description, possessing three or four merchant vessels, with which he contrives to enrich his purse in no insignificant a manner. Other ships may be seen in the harbour belonging to the merchants, but the chief support of their trade is derived from vessels that pass along the coast on speculation. The manufactures of this town are not very extensive, principally consisting of coarse cotton cloth, gunpowder and implements of war.

The Government of Shehr is conducted in a very superior style. The present Sultan (upon whom the whole power devolves) being an able and intelligent man, twenty-six years of age, and although so youthful possesses judgment and discretion that would do credit to ripe years. His air and address immediately prepossess the stranger in his favor, added to which his mind seems expanded by right principle,—in fact, he looks and speaks the "gentleman" more nearly than Arab princes usually do. In his capacity of Sultan he observes a noble dignity, tempered with singular kindness towards the whole of his subjects, and as a Judge he comports himself admirably. Controversial disputes are transmitted to him by a Mullah, who is permitted on all occasions to offer an opinion, but the decision of the case wholly depends on the Sultan's pleasure. He displays an extraordinary benevolence, in this last character regarding the prayer of his humblest supplicant with an equal attention to that of his more exalted petitioner; thus he renders himself beloved for his charity, yet dreaded for the strict rigidity of his justice. In causes of great importance he assem-

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bles a council, which generally consists of his own kinsmen,—the majority, in such instances, decides the verdict, whereby the culprit or culprits unmurmuringly abide. The religion is Mahommedan, which is strictly enforced by the laws and carefully followed by the Sultan, but the people generally seem to observe its tenets with great pertinacity, and it is very remarkable to find Protestantism make such slow progress in its march towards these nations, although their intercourse with Christians is so constant.

The tribes under the dominion of Sultan Sheikh Ali ben Nasir are called collectively Hamum—sub-divided into classes, from one of which the Kassaideen, their chief, was chosen. They rank as follows :—

Beit Ali.	Beit Shenein.	Benochee.
— Aghraf.	— Hagghail.	Sa'il.
— Bussida.	— Kassaidee, or	Hakkam.
— Hamudiyah.	Kuzaad.	Hur.

Passing onwards to the eastward, the coast continues very regular and safe, and a vessel may approach it at any place in eight or ten fathoms.

HAMI, the next town, lies just below the double dark hill of the same name, beneath which will be observed a grove of date-trees. This village is in lat. 14° 46′ 50″ N., long. 49° 53′ 20″ E.; in approaching it, it takes the appearance of two separate villages, the greater half being situated behind the other, most picturesquely enclosed by a deep ravine, having a line of trees and cultivated ground near the beach.

Anchorage—I would recommend a vessel to anchor rather less than one mile off shore, where she will find from seven to eight fathoms, bottom sand, shell, and broken coral. This was the position I took, and I think it may be found better than a nearer approach. Supplies are immoderately expensive, and difficult to be obtained, a few vegetables and miserable sheep, the largest weighing only fourteen pounds, and indifferent water, were the only articles to be met with in 1836.

The population of Hami is very small, numbering only 500 souls, who are governed by a Sheikh, Kasaidee Said ben Abdulla ben Salem; Ben Hamed ben Abderaman held this office in 1835, to whom I had the honour of an introduction; but, poor unfortunate wight, he was murdered at the beginning of 1836 by some bush-rangers, while quietly riding through a retired part of his own gardens; the balls from two

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matchlocks entered his heart at the same time, and caused his instantaneous death. My party were treated with kind and respectful attention by him, and indeed by each inhabitant we met, and throughout our excursions he had the civility to accompany us, attended by a body-guard of forty Bedouins. Constant feuds were prevailing at this time between the people of Howaiyah and the neighbouring towns, lasting probably about one month together, but seldom commemorated by events of bloodshed and distress like that above described. If a vessel should perchance anchor here, her commander is rather astonished to find a duty of three per cent. levied on every article he lands or purchases. Four or five small boats comprise the utmost of his shipping property, and but very insignificant trade is ever transacted here. Fishing appears to occupy a great number of the natives, together with cultivating the land around their separate dwellings.

Hot springs are numerous in the village of Hami, and the temperature of those I examined stood at 140°. From Hami, the coast runs in an easterly direction until you approach Ras Sharmah, a sandy beach and regular soundings the whole way.

Cape Sharmah, a narrow projecting headland in lat. 14° 48′ 30″ N., long. 50° 2′ 30″ E., running about eight miles east and west, with a straight line of coast, intersected by strata of limestone, and chalk cliffs of 300 and 400 feet rise perpendicularly from the water's edge, and are clearly seen at twenty-five miles distance.

Ras Baghashu, a rocky point in lat. 14° 49′ 10″ N., long. 50° 9′ 30″ E., 15,000 yards from Ras Sharmah, of which it forms the eastern bluff; there is, however, a curved hollow between the two, called Dhafghan, wherein boats occasionally anchor; this nook is fronted by a sandy beach, and may be easily known by observing the gaps in the cliff (a little to the eastward) opening on the village of Githrum, nearly equidistant from the two capes Sharmah and Baghashu; on approaching they appear to form but one branch of land intersected by broken perpendicular cliffs—Baghashu itself being a bluff of 300 feet elevation, and may be seen at five and a half leagues from the coast. Five and six fathoms may be had a few yards off it. The little village of the same name lies in the centre; a very miserable anchorage, bad water, and no supplies of any kind to be obtained for man or cattle.

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SHARMAH ROCK, in lat. 14° 48′ 20″ N., long. 50° 1′ 57″ E. The channel between Cape Sharmah and the rock is 340 yards broad, with fifty-six and fifty-seven fathoms in it, deepening towards the rock, which may be approached within a few yards.

GIBUL HAMUM, a limestone mountain situated two or three miles to the northward of Baghashu, in the vicinity of which many curious specimens of hieroglyphics still exist,—springs of good water and considerable cultivation. The inscriptions are of the same character as those discovered by our party at Hisn Ghorab. This part of the coast from Sharmah to Gossein has a magnificent range of mountains, called Ben Shamayik in the background, continued by those of Asselt, beautifully sprinkled with extensive and luxuriant valleys.

SHARMAH BAY, formed between Ras Sharmah and Hisn-el-Misenat, a ruin standing on a neck of rock land; to the northward are several bluffs and projections from the main land, which not only extend the limits of the principal bay, but also form numerous lesser ones, by the Arabs denominated, Bander Shesar (with a solitary building on its beach), Bander Sicafat, Julpah, &c.

Sharmah Bay is considered the finest on the coast for shelter during the N. E. monsoon, and the smaller ones are frequently used by boats and native vessels. Very good anchorage may be found in Bander Shesar in four or five fathoms with Sharmah Point S.S.E., and the rock of Sharmah 600 yards off it; but the most frequented anchorage lies off the miserable village of El Ghur in the depth of Sharmah Bay, where vessels may be perfectly secure in from two to five fathoms. Indeed, in any part it is very snug, and by the accounts of the natives I learn that vessels have actually weathered the S. W. monsoon under the lee of Sharmah-rock. I anchored in six and a half fathoms about half a mile off El Ghur,—this village bearing north of me, with that of Julpah N. W. These villages are inhabited by fishermen, who seem to be the most wretched of their kind, procuring a maintenance by the use of a few small boats, which are invariably lightened of their freight in each daily return from labour, by the Bodouins, who tolerate this little community for no other motives than that of obtaining fish at a cheap rate.

DEES, a small town three or four miles N. W. of El Ghur, containing about two hundred houses, inhabited by nearly 1,000 souls,

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defended by a poorly constructed fort, in the neighbourhood of which there are several hot springs.

In 1836 the Dowlah (or Governor) was a person by the name of Iam ben Hamed; its legitimate chieftain is Mahomed Amar ben Omar, the owner and captain of a fine ship, the command of which he prefers to the royal prerogatives of an unsettled government. He is, however, so universal a favorite that the assumption of his regal titles would be hailed with considerable satisfaction by his subjects, who look upon him with almost a god-like reverence, attached no doubt by his immense wealth, unlimited number of retainers, and constant employment of his contented slaves. At the time of which I am speaking, Iam ben Hamed appeared to be completely under the yoke of three sub-divisions of the Al Hammoon (Beit Ghorab and Beit Boussain, Subiee), so that the poor creatures know no relief from the power of bigotry and oppression. The Beit Ali muster about 1,000 matchlocks, the two last not more than 500 each. Revenge for injuries committed long since prevails here to an extraordinary extent, for the people, principally consisting of Beit Ali, apparently consider it most honorable exercise for their warlike dispositions. During our visit an agreement was entered upon to keep up incessant fighting for twenty days, and truly anxious were the poor women and fishermen, who are permitted no part in these turmoils, for the termination of the strife. The chief of the Beit Ali tribe is a man of great influence among the natives, he is entitled Sheikh Hassan ben Ali, and is agreeable in his manner to strangers. The first salutation I received from the worthy chieftains was a demand in writing, signed by four persons, requesting me forthwith to pay the bearer—

For anchorage duty	30 Dollars	Ghee	30 lbs.
Gunpowder	30 lbs.	Wheat	30 lbs.
Coffee	30 lbs.	Rice	2 bags.
Sugar	30 lbs.		

Of course I felt a slight degree of amusement at the idea of the moderate demand, and replied that I had certain reasons for not obeying the order per express, which I dare say would be explained on my landing. After delivering my message to the authorities on shore, my friends returned, apologising for their ignorance of European customs, and politely offering to conduct us to their masters, promising safety and protection to our whole party; and, to our satisfaction, we found their faith kept in the most scrupulous manner, and no farther tax imposed.

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Several of the Dowlah's suite attended the officers into the interior, to visit some very curious inscriptions, of which the Bedouins had previously given me an imperfect copy. It was not many days before we had established a mutual confidence, and the consequence was, that our vessel was surrounded by the poor and sick, who came to us, supplicating relief from the "white men." One singular coincidence was brought to my notice, which I record as a testimony of the Amazonian dispositions of the ladies in this part of our habitable globe, of a young man of becoming appearance and gentle address, who came on board sadly disfigured by the use of his wife's finger-nails, and so terribly had she taken up arms against her poor lord, for some mysterious fault, that his case seemed perfectly hopeless, nor do I think he could ever be expected to recover from the blindness occasioned by this domestic broil. We remained but a short time at this village, and quitted it with a most favorable recollection of the inhabitants, who I have little doubt will hesitate before they again present so strange a mandate to a British officer as the one that greeted my arrival.

The anchorage of Dees has apparently been a spot of great importance; the fort of El Misenat bearing sufficient evidence of superior architecture, better in every respect than the buildings of the present day. The dilapidated reservoirs and several other edifices, although in perfect ruins, must have been the work of skilful artists. A few date groves are barely perceptible far inland, but the ranges of cliffs and low land bounding the sea bear no vestige of fertility. It is high water at full and change of the moon, 8·30 rise and fall seven feet six inches, and in 1835 the variation was 4-39 westerly.

THONBAN, a village about four miles inland from Dees, inhabited by a few independent Saids, and governed by a patriarchal Elder, Sheikh Omar Mul Akzhur; a grove of date-trees lies on one side of it, and small cultivated plots of ground planted with vegetables, &c. There is a hot spring at this place, in great request by patients who are afflicted by rheumatic pains.

GRAEN, a scattered collection of huts and wigwams, perhaps two miles and a half N. W. of Gosseirh, under the dominion of the chief of that town.

GOSSEIRH, a town containing a number of stone buildings, but for

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the most part filled with huts, &c.; its population is computed at 300, nearly all of the Beit Ali and Beit Ghorab tribes. The highest house in the centre of the town is in lat. 14° 54′ 40″ N., long. 50° 21′ 50″ E. The chief or sheikh of this place is Mahommed ben Said; the inhabitants possess a few small trading boats. Sharks are caught here in great abundance, the bodies of which are eaten by the natives, while the fins and tails are forwarded to India, *via* Muscat, for the China market, and sell at a good price. While we were cruising off this place, I hired one of their strange fishing canoes; sharks were caught in great numbers, mostly of the hammer, or "expanded head" kind: in one of them sixty young ones were found. A short distance inland there is a well of four feet depth, from whence these people occasionally obtain good water, but we could get none that was drinkable; provisions, too, were very scarce, and expensive; Custom receipts, as might be expected, add but a sorry pittance to the annual revenue.

Anchorage at Gosseirh is very rocky close in, but a vessel will find a safer position in twelve fathoms, about 1800 yards off a rocky reef projecting from Ras Gosseirh, which last consists of a small ledge of rocks extending from the sandy beach, and bears from the highest house before given S. 5, to 3100 yards distant: it may be distinctly known by the black heights which encompass its interior. The small nooks and hollows among the arm of reefs are made very useful by the fishermen, &c., providing shelter for their small boats according to the direction of the wind. The coast from Gosseirh to the next town runs slightly concave, with a steep sandy beach; cultivated ground is not to be seen, saving a few narrow lines of some dwarf vegetable, varied by a date-tree.

Serar, commonly called Raidah Seghir, a village about six miles and a half (nautical) from Gosseirh, having a population of 80 to 100 souls. Date-trees are abundant near the houses.

Harrah, in lat. 14° 57′ N., long. 50° 24′ 20″ E. W.S.W. of Serar, conspicuous from its round tower. A house here and there occupies, or rather enlivens the space of country until you reach

Raidah, a small town on the sea coast, containing about 200 buildings with a population of 700 souls. Its highest house is in lat. 15° 1′ 20″ N., long. 50° 30′ 45″ E.—These habitations are chiefly built of mud and stone, and the architects seem to have huddled them together in order to occupy as small a space as possible, without

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the slightest regularity roads are quite out of the question. This town is especially celebrated amongst the natives as enjoying the constant presence of one of the highest caste chieftains on the coast, to whose ancestors the whole part of southern Arabia belonged. The present Lord is now contented to trace his descent from the principal of eight bygone generations, and of course maintains the diginity of his forefathers with every ostentation of greatness. The title and name of this person is Sultan Ali ben Abdullah ben Omar, ben Omar, ben Jaffer, ben Jafferbin, Ali ben Ali Mahomed, ben Mahomed ben Abdul Woodond who has two children, three brothers named Mahomed, Sallah, and Afzella; he has also many relations about him, and possesses seventy-five male slaves as personal attendants. In stature, the Sultan is of middle height—nearly fifty years of age. A startling and singular belief exists amongst this people concerning the chieftaincy of their tribes,—they tell you that as soon as a man assumes the diginity and power of Sultan his right hand gradually becomes deformed, the nails turning into the palm and there growing until it presents a most unnatural and horrible appearance—and I should imagine it to be equally painful as unsightly: however, they conceive it a certain proof of noble parentage, and this is the respect perhaps that induces the reigning Sultan to bear the pains and penalties of his high office with becoming amiability. His son who was (at the time I saw him) a fine handsome boy, is to inherit the chieftaincy on the death of his father, and with it the natives say the frightful transformation in the aforesaid member. The Sultan had occasion to write his signature in my presence, and it was perfectly astonishing to observe with what surprising dexterity he managed the reed which answers for a pen between the hollow of his thumb and first finger.

The government of this Sultan seems to give great satisfaction; he is much respected for his universal kindness, hospitality, firmness and justice. Formerly this territory extended from Furtuk to Sasseeda,—it now only reaches from Boughtshau to Misenat, the whole of which produces little revenue, with not more than twenty or thirty small trading boats,—the largest is the property of five Banian merchants residing at Raidah, commanded by a brother of the Sultan. Their trade is principally carried on between Shahah, Makallah, Sokotrah, Zanzibar, and Mocha. The exports are frankincense, aloes, ambergris, sharks' fins, tails, &c. The last is the most lucrative.

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The Sultan is of the Kassaidee tribe as also some of his subjects, the rest are of the Beit Ali and Ghorab, being all subdivisions of the Al Hummun.

The anchorage off Raidah has no less than twenty fathoms within a quarter of a mile of the beach, and therefore it would not be prudent for a vessel to take up a position here, it being an open roadstead. The coast to the eastward runs in a straight direction, the soundings bold, in fact too much so for anchorage. I anchored at a small village about ten or fifteen miles to the east of Raidah in twenty-three fathoms 1,200 yards off shore, in a calm and contrary current.

MISENAT, an antique ruin on the coast twelve miles and three quarters east of Raidah, in lat. 15° 3′ N., long. 50° 43′ 25″ E. Here is a beautiful spring of excellent water, but the land is swampy and thinly bestudded with mangrove-trees, which give it an air of quiet desolation. Originally it has borne pretensions of a more formidable kind, as there still remain many relics of interest,—one antique ruin of dark stone possesses to this day great strength, and was evidently intended to answer no unwarlike purpose. We could not discover any stone of a similar kind in the neighbourhood of the place. I cannot help fancying that the lagoons now traceable once formed its ports or back-waters, and that a town of considerable consequence stood near protected by the ruin alluded to. Upon enquiry the fishermen informed us that a number of coins and various other curiosities have been picked up at different times, amongst them a pair of scales, which were discovered beneath the walls of the fort. It is strange to find this interesting coast, which in other days must have been so fertile and replete with sacred and absorbing recollections, now almost entirely desolate.

At this place a party of officers, consisting of Lieutenant J. P. Sanders, Dr. J. Hulton and Mr. Smith, left the *Palinurus*, and proceeded several miles inland, where they were fortunate enough to discover many inscriptions similar to those of Hisn Ghorab to the east of Wadi Sheikhawi, about twelve miles distant from Misenat, and three miles from the village and grove of Mayskee; here they rested, and were abundantly supplied with excellent water. A few spots of cultivated ground led the travellers to anticipate more civility from the ungracious natives than they subsequently met with; yet in truth, be it said, that the tenderness of feminine nature laid defiance to the uncourteous

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welcome of her surrounding clan, and to one female alone were they indebted for any kindness or attention received during their stay. She was a girl of uncommon beauty, and seemed a creature distinct from the rebel throng beside her,—at least so far exalted above them that she even looked the divinity from whom they might learn the softer and kinder feelings of humanity. After having spoken in a kind and gentle manner to my poor wearied friends, she busied herself in proffering the best dainties of her rustic board, providing milk, dates, and other store until the half-famished travellers regained a portion of their energy to pursue the fatiguing way back to the ship. One gentleman of the party completely won the heart of the lovely brunette, shewing him more than his share of attention, by a *magnificent* keepsake of needles and thread, with which she appeared immoderately delighted.

WADI SHEIKHAWI, ten miles inland, may be easily distinguished by a remarkable gap in the mountains that encompass it; I am told that several fertile villages are hidden within this beautiful and sublime valley. The coast between Misenat and Sihut is low and dreary, with a gradual ascent to the Sheikhawi mountains, the eastern termination of which is on the western side of Wadi Masella. The bank of soundings extends here for some miles off shore, and are pretty regular. The Mahrah territory commences at Misenat, and continues nearly as far as Marhat.

Abdul-Kuri, or Palinurus shoal, a dangerous shoal off the Arabian coast unknown to both Arab and European navigators until the survey of 1835. An old fisherman, who had lived for many years in the neighbourhood, pointed it out to me as a remarkable spot, where I might find plenty of sharks, but it was not until after long and persevering entreaties that I could prevail on the man to accompany me on a voyage of discovery: however, he did at length yield, and we set out together accompanied by his own boat. On our arrival within a short distance of the shoal, he bade me observe his mark, where the current was running to the E. N. E. at the rate of three miles per hour (by Massey's patent log), and I was compelled to anchor in thirty fathoms on the water edge of the bank extending off shore, while he proceeded in one of the quarter cutters to search for it; the poor fellow sailed and pulled about for some hours without success, and as I imagined by his own mark in a wrong direction. Cconcluding, however, that his conduct proceeded

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either from infirm sight or timid apprehensions, I despatched Lieutenant Jardine in the launch, and there being sufficient wind to stem the current, I weighed the surveying vessel and kept to the westward. The launch (lying east of me) first got a shoal cast of seventeen fathoms and let go her anchor, but found herself in forty, owing to the strength of the current. In the ship the first cast was in twenty-two fathoms, when I brought up with the stream anchor, but finding the current running with increased rapidity, and seeing a complete break within a few yards astern of me, I kept the top-sails full to lessen the strain on the small chain, then let go a bower anchor, bringing up within 250 yards off the break, the old fisherman (our pilot) being at this time about five miles to the eastward. How this happened I cannot tell, for the shoal was eventually discovered by a close observation of his given mark, information of which I fortunately drew from him previous to his quitting the vessel. The position of the *Palinurus* was off the south-west, and less than 250 yards of a four fathom pointed rock. The shallowest part of this newly discovered shoal is in lat. 14° 45′ 50″ N., long. 50° 45′ 20″ E., decided by observations made on the spot by Lieutenant Sanders (a very excellent and accurate observer) and myself, but agreeing by trigonometric and chronometric measurements to a few seconds. The variation of the compass by means of twenty-three observations being 4.26 westerly. The shoal extends for 1850 yards in a N.N.E and S.S.W. direction, and is from 300 to 600 broad, with a bottom of alternate rock and coral.

The soundings round this shoal cannot be relied on, as they vary so suddenly and do not always decrease on approaching it. The nearest land is the antique ruin of Misenat, which is eight miles and a quarter off, and nearly on a transit with the east bluff of Sheikhawi Gap. When on the shoal this Gap lies fairly open, the western bluff of it bearing true N. 9′, 46″ W., and the eastern end of the Sheikhawi mountains N. 12′ 50′ E. The sandy beach on the main-land is not discernible. A flat surface is sometimes perceptible on this spot, and the old fisherman assured me that there was considerably more depth of water on the shoal when he was a boy, which I concluded might have been forty or fifty years since, and at that period no coral whatever could be distinctly perceived on its bottom. From these accounts, and the opinions I had already formed, I would seriously recommend navigators

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wholly to avoid this spot, passing either between it and the shore, or else keeping a good offing outside, as I feel confirmed in the idea that the shoal will almost perceptibly become more shallow. In 1835 the soundings were according to the following table, measured from lat. 14° 54′ 50″ N., long. 50° 45′ 20″ E.

Miles.		Fathoms.	Miles.		Fathoms.
¾	W. S. W.	105	2	S. E.	64
1	S. W.	80	2½	E.	96
2	N. N. W.	140	3¼	N. E.	120
1	W.	130	2	N.	120
2½	S.	130 to 140			

(End of Part First.)

(True Copy,) A. MALET,
Chief Secretary.

ART. VI.—*Part Second of Captain* S. B. HAINES' (*of the I. N.*) *Memoir of the South and East Coasts of Arabia, with his Remarks on Winds, Currents, &c.*

HAVING in the First Part of my Memoir of the South and East Coasts of Arabia, attempted a description of that part that had been minutely surveyed as far as Misenat, I commence from thence, trusting that though all parts of the coast are not actually laid down by survey, I shall be able, from my knowledge and experience of the localities of the different points, to give some useful information to the Mariner and to Geography; and in so doing, I can only again offer my sincere thanks to the officers of the Indian Navy, mentioned in the note,* whose utmost zeal and exertions, united with every friendly and good feeling, were always rendered throughout our long and fatiguing cruises.

WADI MASILAH, or Musselah, a large and extensive valley forming the line of communication between the seaport towns and the province of Hadramaut. It commences in lat. 15° 25′ N., and long. 50° 55′ E., having on its west side the high range of mountains called Gibul Asad. The valley is well watered, the villages and date groves are

* Lieut. (now Commander) Sanders. Lieutenants, Jardine, Shephard, Bell, Rennie, Cruttenden, Stevens, Barrow, A. Grieve; Dr. Hulton and Mr. Purser Smith.

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numerous, and the soil well irrigated by running streams. The inhabitants are of the Mahrah tribe.

SIHUT, a large looking town from seaward, but on visiting it the greater part of the buildings were in a dilapidated state. It is in lat. 15° 12′ 30″ N., and long. 51° 19′ E. The population varies from 300 or 400 to 2000, according to the trade and season. The town and district are under the government of Sheikh Ali Backrit; the people are of the Mahrah tribe. Considerable intercourse with the interior is carried on through Wadi Masilah, and the following distances may be relied upon as the length of journey for a camel laden with merchandize—viz. :—

Sihut to Terim . . 8 days.	sive valley abounding in villages and cultivation . . . . . 12 days.
Do. to Shibam . 8 „	Sihut to El Gharfar (Karfar). 7 „
Do. to Do'an . . 12 „	Do. to Terim . . . . . 8 „
Do. to Wadi Ahmed, an exten-	Do. to Ghassim, (Kasim). . 8 „

The traders of Sihut have about thirty large and small vessels belonging to them, with which they carry on a lucrative trade along the coast in grain, at other times their smaller vessels are employed in shark fishing, from which they derive considerable profit. The fins and tail of the shark, after being dried, are sold at Makallah or Maskat, and ultimately are sent to the China market *viâ* Bombay. The scattered stone buildings in the neighbourhood of Sihut are built as places of defence against small arms; and the revenue collected and secured by the local governor, Sheikh Ali, but rarely finds its way into the coffers of the Sultan, whose residence is at Gheshen. The anchorage is an open roadstead, and the bank of soundings extends to sea a considerable distance, having 21 fathoms at six miles off shore, with regular decreasing soundings as you approach it.

Proceeding to the eastward the first cape, or rather projecting point is called Ras Aghrib, a high red sloping point, having sixteen fathoms about two miles off. Between this cape and Ras Hattab there are three bluffs, nearly equidistant, with small sandy bays between them. Ras Hattab is a piece of land, moderately elevated, terminating in a low point, in lat. 15° 21′ N., long. 51° 36′ E., which forms the western boundary of Bander Liban.

Immediately to the eastward of Ras Hattab, and close to the beach in the centre of the bay, is situated a town named Hattab, contain-

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ing about 100 houses and three mosques, the western one having a minaret. To the westward of the town about one mile, there is a grove of date-trees, and to the eastward there is a small well. The town contains a population of about 400 souls, and is under the government of Keshin, or Keshein.

BANDER HATTAB, or Liban, is a deep bay situated immediately to the westward of Ras Sharwein, having regular soundings, and affording shelter against strong easterly winds, with a fresh sea-breeze; there is a considerable surf on the beach.

RAS SHARWEIN, a high dark point, having two remarkable peaks on its summit (commonly called by seamen "Asses' Ears,") this mountain gradually decreases in elevation towards its southern extreme, which is in lat. 15° 19′ N., and long. 51° 46′ 30″ E. This cape forms the western side of Keshin Bay.

The town of Keshin, in lat. 15° 24′ 50″. N., and long. 51° 49′ E., frequently called Kissin, is a miserable straggling village near the sea, in the centre of a bay formed by the projecting points of Ras Sharwein and Ras Derkah; some of the houses are built of stone and mud, two stories high, the others are of cajans, bamboos, and mats. At this village resides the principal chief of the Mahrah tribe, Sultan Omar ibn Tawari, who assumed the supremacy after the death of his brother Seyyid ibn Tawari,—the rightful heir, Ahmed ibn Seyyid, being too young to govern.

Having, in the execution of the commands of the Bombay Government, had opportunities of judging of the character of this chief of a once powerful tribe, I must digress a little from my subject, as it will not only enable me to give an insight into the character of a proud and remarkable Arab chieftain, but also afford an opportunity of explaining circumstances, regarding which a publication on Sokotrah by my assistant the late Lieutenant Wellsted, of the I. N., appears to have caused an erroneous impression.

In the beginning of 1834 I received the commands of the Government of Bombay to trigonometrically survey the Island of Sokotrah, and immediately left Rejjat Jezar, and stood down to Morbat, to ascertain who, by hereditary right, held legal tenure of that island. Having been successful in my inquiries, I left for the anchorage under Ras Derkah, and from thence immediately opened a communication with

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Sultan Omar ibn Tawari at Keshin. After presenting a few trifles to the Sultan and his nephews, Abdullah and Ahmed, I received a written document, properly signed and sealed, granting me full permission to examine all harbours, &c., on the island.

Having received this I weighed anchor and in three days reached Tamareid in Sokotrah, where I soon found myself on friendly terms with the peaceful inhabitants of the island. My first duty as a Surveyor was to commence in such a manner as to be certain of completing the survey in every branch, and having the chart draughted within the time granted to me by Government; and as the kindness of Rear-Admiral Sir Charles Malcolm left me to to judge of the practicability of examining the interior of the island (as will be seen by the para. from his correspondence,)* I availed myself of it, knowing how anxious the Government had ever shown themselves for the advancement of geographical knowledge.

I decided, therefore, that while I conducted the Trigonometrical Survey of the Island, my assistant should leisurely travel over the entire interior; and to assist him, I ordered Mr. Midshipman Cruttenden (now Lieutenant), who understood the Arab language and character well, to accompany him. My orders were as follow:—

To Lieutenant WELLSTED, Assistant Surveyor.

SIR,—It being the wish of Government to obtain all possible information regarding this Island, not only as to its geographical position and harbours, but its government, population, produce, fertility, and quality of the soil, as well as the religion, customs, manners, power, and wealth of the inhabitants,—you are hereby directed, for the purpose of ascertaining it, to travel by land to Golonseer, where it is probable you may again meet the vessel, taking any route according to your judgment, after obtaining information from your guides. From Golunseer, I leave you a discretionary power as to your future route, so as more fully to perform the important duty upon which you are engaged. On your travels I need not remark that any information you may be able to collect, either in Geography, Geology, Botany, Zoology,—indeed, any science that may assist us in a thorough knowledge of the Island, and its productions, will be of the utmost service. Mr. Cruttenden will accompany you, and you may hire a guide, and whatever assistance you may require at the public expense, on your return giving me an account of the same.

* "If your negotiation is successful, and you find the Arab chiefs your friends, do you not think it might be a favorable opportunity to let an officer go inland? However, in this be guided by circumstances, and the trust you can repose in the people."

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Having been accustomed to meet with the different tribes on the coast during the survey, and knowing the utility of a friendly and free intercourse with them whilst employed on such important duties, renders it unnecessary to caution you, or to inform you, that such is our present system of policy; your official report and remarks, will be forwarded in to accompany the Survey of the Island, and my exterior directions, Golunseer will be your rendezvous.

Tamareid, Sokotrah, January 9th, 1834.

(Signed), S. B. HAINES, Commander, I. N. and Surveyor.

Having executed the commands of Government within the time specified, I forwarded a fair copy of my Survey, with my own observations on its anchorages, and the united efforts of all my officers, who had made any observations during the cruise, consisting of papers from my assistant Lieut. Wellsted, and the late Dr. Hulton, and Messrs. Cruttenden and Smith. This statement is sufficient to prove that Lieut. Wellsted was only a subordinate officer, acting in obedience to my orders, and not the Surveyor of Sokotrah.

The direct communication by steam being the anxious object of the Supreme Government of India, it was considered probable that Sokotrah might answer for a depôt. I was in consequence sent on a mission to Keshin to obtain the Island by purchase. On arriving there I despatched Lieut. Wellsted on shore to inform the Sultan of my arrival, and to ascertain when it would be convenient for him to see me. The reply of the Chief was "to-morrow," and I accordingly went over accompanied by Lieut. Sanders, Dr. Hulton, Messrs. Smith and Rennie. We were ushered into the house of Sultan Abdullah, with whom we found Sultan Ahmed, the rightful heir, a lad about eighteen years of age. The chief Cazi then made his appearance, and the nephew Abdullah having retired for a few minutes, returned leading in his uncle Sultan Omar ibn Tawari, who was totally blind, about fifty years of age, apparently more so from bodily deformity, his stature not exceeding five feet three or four inches, his head large with a round forehead, his eyes very disgusting,—the eyelids hanging down so as to leave the dull filmy eye visible and protruding. His voice was strong, and in manner he was extremely frank and energetic.

After the usual salutations and polite enquiries after each other's health, he begged us to be seated on a carpet; after a minute pause the Sultan said, "I wish I could see you, your voice is young and strong.

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Have you been long away from your home?" I replied, I have served my Government for many years, and have now the pleasing duty to inform you that I have been honored by receiving their commands to thank you for your liberal kindness last year, and to assure you of their friendship, also to explain to you their wishes on some important points as soon as we shall be alone. The room was cleared in an instant with the exception of the Sultan's family and the Cazi, when I was desired to express my wishes freely. I explained to him that to carry on steam communication between India and England a depôt under British control was requisite, and that consequently I was commissioned by Government to purchase Sokotrah from him. I pointed out its inutility to him, and the advantages he would derive from disposing of it to the British for a sum of money, and also explained the advantages that would be secured to his people by trading with the Island when under the British flag. In fact, I placed the sale of the Island in as glowing terms as I possibly could colour them. He listened calmly and attentively; the crafty Abdullah also appeared deeply interested, whilst Ahmed's idiotic countenance exhibited a careless indifference to the subject. The Cazi was a silent listener.

A few minutes' consideration sufficed to enable Sultan Omar to decide upon his reply, and he commenced by complaining that the British had promised that his boats and men only were to be employed in coaling steamers, whereas the Bengal steamer was otherwise assisted, to the injury of himself and people. I told him that the duty I came on, if successful, would annul all former agreements, when he, to evade the point of transfer, asked me where I intended to go after leaving Keshin; I replied that my cruise would chiefly be influenced by his decision with respect to the transfer of Sokotrah by purchase to the British.

After a pause, he said in a firm and decided manner, "Listen, Captain Haines, and I will give you an answer. As sure as there is an only God, and he is in Heaven, I will not sell so much ground (making a span with his fingers). It was the gift of the Almighty to the Mahrahs, and has descended from our forefathers to their children, over whom I am Sultan." I pointed out to him that the Island was conquered by his tribe after its evacuation by the Portuguese, that it was so widely separated from him that its value could not be compared to what I was prepared to offer; but hastily interrupting me, the chief exclaimed "Aná má yáthi"

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(I will not give) so much ground (confining his span to two inches), but I am ready to abide by our former treaty."

Determined to leave this resolute old man on good terms, and not being desirous of prolonging so unsatisfactory a visit, I rose, and in a laughing manner said—"Well, Sultan Omar, since your determination of 'Aná má yáthi,' is not of very long consideration for your own benefit, and without consultation with the elders of your tribe, I will return to my ship, and remain some time, to enable you to consult with your relations and friends on the advantageous offer I have made you on the part of the British Government."

On my repeating the Sultan's expression, "Aná má yáthi," a general laugh ensued, and we parted apparently the best of friends.

Several letters passed between me and the Sultan afterwards on the subject of the transfer, but he remained firm to his first decision, and no argument that I could bring forward induced him to waver.

The character of this old chief I admired: a cripple and deprived of his eyesight, he never forgot that he was the Patriarch of his tribe, and avarice (that Arab vice) failed to tempt him to barter his birthright for money. He evinced no anger throughout; was polite and firm, telling me that he knew we could take his country by the strong arm, but that he believed our principles of justice would not permit us to do so. When parting he said, "God is witness we have both endeavoured to fulfil our respective duties—you to your Government, and I to my tribe, as their father. Farewell.

Having thus totally failed in the purchase of the island, I stood over to Sokotrah, and assisted in landing the troops sent from Bombay to protect the coal.

Sokotrah has led to many discussions and much correspondence: and though its romantic views, precipitous passes, waterfalls, produce, &c., are now pretty correctly known by the various papers of the officers of the vessel I commanded, with Lieut. Ormsby's and my own, still, as some new production was found every visit, I am inclined to think that there are still many others, that might be found by any scientific traveller who resides amongst the mountains for any length of time.

I have made this digression, and introduced Sokotrah merely in justification of myself and other officers under my command. Lieut. Wellsted having introduced my name, ever erroneously, in his work, though he

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published my Vocabulary and Meteorological Register, and has stated matters with such tact, that a stranger to him would believe he was the principal throughout. To the late Dr. Hulton and Lieut. Cruttenden, I. N., was the late Lieut. Wellsted much indebted for information never acknowledged; and how far I am indebted to Lieut. Wellsted for assistance, an extract from his official letter to me, now in my possession, dated 18th July 1835, upwards of a year after Sokotrah was surveyed, will prove.

"I send the working chart, which I should feel greatly obliged if you would cause some one to trace off, and send back; you will at once perceive it is but a poor specimen of chart making. It is the first I ever made, or rather, I may say, attempted to fill up."

The chart here alluded to was only a few calculated distances I had put on paper, so that Lieut. Wellsted might lay down the soundings of the channel between the Abyssinian coast and the "Brothers," which I regret to say he did incorrectly.

But to return to Keshin. The village has a paltry bazar, kept by a few Banians, and the whole population may amount to 300 or 400 souls, who possess two or three trading boats—and ten smaller fishing boats.

During the strong North Easterly monsoon the surf on the beach at Keshin Bay is so high that landing is at times dangerous in ships' boats; but the native fishing craft, which are sewn together, and have almost a flat floor, pass through the surf in safety, and are hauled up immediately the fisherman's daily toil is over. Trading boats wishing to land goods in the North Eastern monsoon, do so at a small nook immediately to the westward of the precipitous cliff called Ras Derkah, the eastern point of Keshin Bay. During the South Western monsoon a swell rolls into the bay, unless close in, on the Ras Sharwein side.

The soundings all over the bay are tolerably regular, with good holding-ground in from six to ten fathoms. The coast round Keshin Bay is low and sandy near the sea, having a high range of hills of dark aspect as the background, and a barren tract of undulating sand-hills intervening. The country in this part of the coast is barren in the extreme; in fact, equalling in sterility the desolate appearance of the Arabian coast forming the south side of the Persian Gulf. To the inhabitants it has one recommendation—fish are plentiful, and of

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excellent quality; they form the staple article of food for the people, and in a dried state are given to their cattle.

The Mahrah tribe is, even at this present day, large and powerful; their territory, with some few exceptions, extending from Misenat to Ras Sejer near Dhafar. They are, however, under different chieftains, controlling divisions of the tribe, the principal being

Sultan Omar ibn-Tawari, who is the representative of the reigning family.

Isa ibn Mobarek ibn Alyan ibn Kaishat, chief of Fartak.

Sayid Akil ibn Ahmed ibn Abdu-llah ibn-l-Hussain ibn Sheikh Abu Beker, chief of Jaizer.

Sheikh Ali Bakrit, chief of Sihut.

Principal Clans;—Beit Efrit, Sultan Omar ibn Tawari, the reigning chief and usurper, the uncle to Ahmed bin Seyd, the rightful sovereign.

The sub-divisions of the Mahrah tribe Beit Efrit, are:

Beit Zehad.	Beit Ahmed.
„ Hushi.	„ Jeizat.
„ Arfat.	„ Safai.
„ Kaishat.	„ Alyan.
„ Osman.	

Of these sub-divisions, the most numerous are Beit Zehad, chief, Mukaddam Hussain. Beit Ahmed, and the Beit Kaishat have the greatest weight in their councils. There are three Sayyeds residing at Sihut, who have some influence, owing to their holy descent and superior abilities. On great political points many of the elders are consulted; and I know that at one time they meditated the removal of the British troops from Sokotrah by force, but were prevented by 'Isa ibn Mobarek, who strongly protested against such folly, and refused to allow his boats to carry the Bedouins over to Sokotrah.

The religion of the tribe is of course Mahomedan, and some of the more educated are scrupulously attentive to its tenets. The poorer classes shew great indifference, and many are unable to repeat the prescribed daily formula of prayers. Circumcision takes place among them just before marriage, often when they are twenty years of age. Their long bushy hair is then frequently shaven, and replaced

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by a turban, if they can afford one; if not, the hair is gathered together so as to form a round knob at the back of the head, and generally the head is encircled with frequent turns of the "fatilah," or prepared match for their matchlocks, which are manufactured in Hadramaut.

A short sword of inferior workmanship, and the never-failing yanbe, or crooked dagger, gaily ornamented with silver and frequently gold, form the rest of their weapons. Their males in person are light and active, of middling stature, and well-knit limbs. They are crafty, extremely hardy and bold. Their dress is a turban with a blue ground and white stripes, and a coarse dark blue waistcloth with loose folds in front, one end passing over the shoulder and round the back, and the other hanging down the right side. Their skins are deeply dyed with the indigo from their clothes, which are seldom if ever washed. When I was received by Sultan Omar ibn Tawari, he wore a sidiriya, or waiscoat of kinkob over a blue robe or shirt. The tribe, generally speaking, when young, are decidedly good-looking, especially the females; but, as with the males, their skins are discoloured by the dye from their dress, which is composed of blue cotton and forms their only garment. Their hair is plaited with silken thread, and hangs down in long tresses over their shoulders; their ornaments are ear-rings and armlets. They apparently pride themselves on the antiquity of their tribe, claiming their descent from the tribe of 'Ad ibn Aus ibn Irem, ibn Sham (Shem) ibn Nuh (Noah). Sheddad ibn 'Ad, in the arrogance of his heart built the famous palace and gardens of "Irem Dhatu-l 'imad," but on preparing to take up his residence there, he and his retinue were destroyed by a storm of wind from Heaven, and the palace for ever veiled from mortal vision, until a man name Ibn Kelabah, in searching after a lost camel, caught a glimpse of it, and entering, he carried off a jewel, which was presented to the Kalifah Mo' awiyah ibn Abu Sufyan, from that period the palace became again invisible. The remnant of the Adites on professing the faith of Islam were spared, and Arab tradition makes them the founders of the country of Hadramaut and the Incense Country. It is worthy of remark, that the language spoken by these people amongst themselves, is an unknown tongue—harsh, guttural, and apparently uttered with difficulty. It has been supposed, and with great reason too, to be the remains of the ancient Hymiari language.

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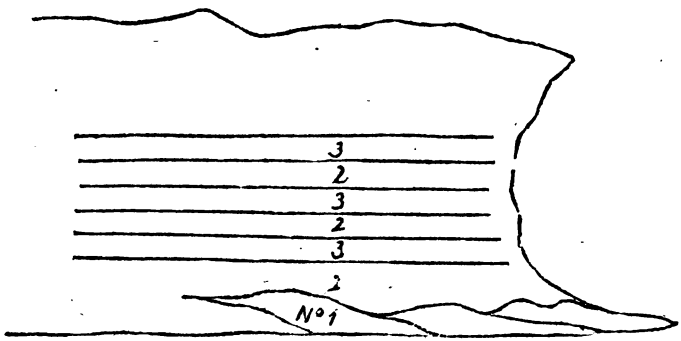
RAS DERKAH, a bluff, precipitous, and sharp point, in lat. 15° 26′ 39″ N., long. 51° 55′ 10″ E., above 300 feet in elevation, and may always be known by having the low sandy bay of Keshin to the westward, and the equally low sandy coast, extending as far as Ras Fartak, to the eastward.

The composition of the cliff is as follows :



No. 1.—Secondary limestone, forming a foundation for the more distinctly stratified masses above. The outer surface rendered cellular, by the action of the sun and air, with sharp irregular points. The colour internally differs, some specimens being nearly white, some cream-coloured, others variously tinged by the presence of the oxide of iron. Large caves are formed in its substance by the violence of the waves dashing againt its base ; some portions of it had masses of flint imbedded.—

No. 2.—White shell limestone, internally pretty compact ; but on its external surface, in consequence of the decomposition of the shells, it becomes porous and full of minute cavities.

No. 3.—Common grey limestone, the tint gradually lighter as it approaches the layer No. 2. The layer above this appeared to be composed of pudding-stone, and those above that again assumed a different appearance, some having a slaty aspect, others, as if they were composed of sandstone, and the uppermost part of the cliff appeared to consist of loose stone, sand, and gravel. The dark shades on the summit of the cliffs are excavations in its substances, in parts of

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which were found large masses of rounded limestone imbedded in a matrix of the same nature. In it we also discovered a few fossil remains of shells (one tolerably entire.) The cliffs from the verge of the cape extend about two miles to the westward, when it suddenly turns to the northward, forming two or three slight concavities, and to the N. E. of the cape there is a sunken rock, some distance off shore. The cliffs continue in a N. E. direction until they meet the sandy beach which run in an E. S. E. direction to Fartak.

Whilst communicating with Keshin during the S. W. monsoon, I invariably anchored in six or seven fathoms sandy bottom, with Ras Sharwein south, 54½° west, Asses' Ears south 66° west. The town of Keshin in W. 3° S., Ras Derkah N. 83½° E., all true bearings. I also made it one of my well-fixed meridional points for cross measurements to other places.

On the low shore between Ras Derkah and Ras Fartak are the villages of Kadifat, Kesid, Wadi Kerbrat, Saghar, Hasweil, and immediately under the south-west part of the mountain of Fartak lies the village of Saif or Kersah. Most of these villages have some stone buildings, and a small plantation of date-trees in their vicinity. One or two of them are situated a short distance inland. To the southward of the village of Haswell is a small pyramidal hill. The villages of Kadifat and Kesid are under Keshin, and those to the eastward of them pay obedience to Sheikh 'Isa ibn Mobarek, chief of Fartak. These villages may in all contain a population of 2,000 souls, whose principal food is fish, jowari-bread and dates; they are poor but well armed, and ever ready to resent an injury. The latter was proved by the people of Wadi seizing a Por-bander boat under English colours, in retaliation for the release of a number of their slaves by the persons in authority at Por-bandar.

The soundings along this coast are regular, but shoal water extends off a considerable distance. A vessel wishing to anchor off any of these villages can choose her own depth from ten to six fathoms, but her boats will generally experience a very heavy surf on the beach. The best anchorage, and place for communication, is off the village of Fartak, known as "Saif, or Kersah." A ship may there anchor in nine fathoms half a mile off shore, with gradual soundings to forty fathoms three

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and a half miles off; but off the east side of Fartak mountain the soundings become much deeper, and continue so round the cape.

The people of Fartak and the other villages have several bugalas and small boats belonging to them, and the nook near the village of Saif affords them shelter during the N. E. monsoon. Sheikh 'Isa ibn Mobarek is both feared and respected by those under him. His trade gives him power to reward his followers, and enables him to call in the assistance of the neighboring Bedouins when required. His voice, therefore, in the councils of the tribe has great weight.

Ras Fartak, in lat. 15° 36′ 40″ N., long. 52° 21′ 10″ E. allowing Bombay flag-staff to be in 72° 54′ 26″ E., is a lofty mountain, of about 2,500 feet in elevation, forming a very prominent cape, which may be seen by the navigator sixty miles off, on a clear day. At a distance it has the appearance of an island of dark aspect, but on a nearer approach, it is found connected by hills of much less elevation to the range of high mountains surrounding the extensive bay of Fartak. I had no opportunity of ascending the summit of Fartak, or of permitting those under my command doing so, which I regret, as many fabulous tales are told of its productions. We remarked, however, with our glasses, on the western side, nearly as high as the summit, a very large grove of trees growing in a circle, the centre of which apparently was barren. The trees were tempting indeed to an observer, accustomed to look at barren and naked ranges of hills and mile after mile of sand hillocks; and this mountain, like the desert Oasis, was doubly pleasing to the eye from its being the only green spot visible. What it could have been, we were unable to conjecture; but the natives say that there are ruins in the vicinity, and this may be another relic yet remaining to point out the power of the Himyari kings when the trade of the Phœnicians flourished in these seas.

I conceive there has been a great error committed by certain geographers, in placing the ancient Syagros at Ras el Hadd, and I am inclined to agree with Dr. Vincent in placing it at the modern Ras Fartak. The following are my reasons for so doing: in the description of different parts of the Arabian coast, Arrian begins with Arabia Felix, which may fairly be transferred to Aden; from this he carries his reader to Cana, Camian or Kana, the site of which has been determined by me as the modern Hisn Ghorab; he then mentions the extensive bay of

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the Sachalitæ, supposed to be the long line of low coast between Makallah and Keshin ; he afterwards remarks the promontory of Syagros, and beyond this again the port of Moscha Arrahun and the islands of Limlia in regular succession. What then can this order of succession be, but Shehr, Fartak, Dhofar, and the Curia Muria islands? beyond all these is Ras el Hadd, which is itself alluded to as the place where the coast takes a sudden turn to the Persian Gulf.

The promontory of Syagros is marked as the largest in the known world, and it certainly is the boldest and largest of any on the southern coast of Arabia ; and had there been another of larger size, the remark would not have been made : but perhaps the best argument that could be adduced in favor of Fartak is the form of the cape as seen from the westward, and we know how fanciful the ancients were in their description of coasts, and how their ingenuity was often exerted to trace the resemblance of the land to some living creature, or well known object—not only the ancients, but navigators of all countries have done this. The Arabs have their Ras Kalb, Dog's Head ; the English their Asses' Ears, Paps, Dolphin's Nose and such like ; and why should not the ancients have the Promontory of Syagros, or the Wild Boar?—which Fartak, when seen twenty or thirty miles off from the westward, strongly resembles.

Between Ras Fartak and Ras Seger the coast forms an extensive bay, the concavity of which is more sudden immediately round the high land of Fartak. During the survey of this coast, I sent the small tender round the bay, and by so doing gained the following information :—

Immediately after passing the high land of Fartak, there is said to be a creek, having sufficient depth of water over the bar, at high-tide, to enable their bugalas to enter for safety during the S. W. monsoon, with deeper water inside. The first town visible, standing close along shore, is El Jaizer, a considerable place under the government of Sayyad Akid ibn Ahmed. It has cultivation in its vicinity, and is a place of some importance, situated about seven miles from the sea. Close on the seashore is the village of Jowari, with a mosque, a few houses, and perhaps two hundred people.

A few miles to the northward of Jowari on the sea shore, is the village of Fittok, and a short distance N. N. E. of Fittok, near the sea shore,

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is a considerable town called Dunkot, which has a fort, and extensive cultivation round it.

The coast from the high land of Fartak is low near the beach, with high land in the interior; but a few miles north of Dunkot the hills come close to the sea, in the vicinity of which some few people reside, under the protection of a small fort known as Jardet. There are also two petty villages in the vicinity, each having for its protection a fortified house. One of these is called Hau, near the sea, with some date-trees near it; the other, Ras Yul, with a plantation also.

These villages terminate the plain extending from Ras Fartak to Ras Seger, and from them steep precipitous mountains commence running towards Seger. Between Ras Yul and Ras Seger there are two ravines, through which the mountain torrents find an outlet to the sea, the southern one of these is called Kais ibn 'Osman, and the other Kais ibn Omar. The tender, while circumnavigating the Bay of Fartak, found anchorage all along in six and seven fathoms, sandy bottom, rather too close to the shore; outside from seven to twelve fathoms, she generally found rocks and sand, and in deeper water, mud and sand.

Ras Seger, a high, steep, and slightly projecting cape, forming the east point of the deep bay of Fartak. It is composed of limestone, and is about 3,000 feet high, with even table-land on the summit. This cape forms the boundary between the Gharah and Mahrah tribes.

Steep precipitous mountains, about 3,000 feet elevation.

Ras Seger. White Cliffs Red Cape, or Ras el Ahmar Bander Resoot. Ras Nus in distance. N. 20, E. 20 miles.

The next point to Ras Seger is Ras el Ahmar, or the Red Cape, and is a continuation of red irregular hills, running out from the steep mountain range, skirting the whole coast from Ras Seger to Ras Nus.

The hills forming Ras el Ahmar terminate in a low point, under which is a small anchorage for south westerly winds, called Bander Risut. This cape is the western boundary of the low land of Dhafar, which from it extends along the coast nearly forty miles, and inland for a still greater distance.

Ras el Ahmar is in lat. 16° 55′ N. and long. 54° 2′ 00″ E.

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and the small anchorage of Bander Risut is immediately on its east side, affording shelter for small vessels during the strong S. W. winds, which not only blow during the regular monsoon, but frequently during January, February and March.

The soil of the district or province of Dhafar (for there is no town of that name) is abundantly luxuriant, well irrigated by mountain streams, enabling the inhabitants to exert their industry in cultivation, if they choose, and abundantly repaying the agriculturist for his labours. Still, though nature has been thus bountiful, the people are indolent in the extreme, generally contenting themselves with what the soil yields spontaneously, in preference to improving the crops by tillage. In some parts, which I shall hereafter mention, the little labour they have bestowed on agricultural pursuits, has amply repaid them, and has, in fact, been one means of making the people more industrious.

On the high mountain range of Subhan—four thousand feet high, which runs along the coast a distance of sixty miles, and has the luxuriant Tehamah, or belt of low land between it and the sea—the soil was good, wild clover growing in abundance, and affording pasture for cows, and immense flocks of sheep and goats, whilst in many places the trees were so thick, that they offered a welcome shade, impervious to the scorching rays of a noon tide sun. Mr. Smith, an officer of the vessel I commanded, was deputed by me to examine the whole Subhan range. He travelled the whole distance with perfect safety, and, under the name of Ahmed, became a great favorite with the mountaineers. He was every where hospitably entertained by them, and they would not even permit him to drink water from the numerous clear mountain streams that were meandering in every direction. "No," they said, "Do not return, Ahmed, and say we gave you water, whilst our children drink milk alone." In every instance they gave him the warmest place at the fire, and invariably appointed some one to attend to his wants. They even extended their generosity so far as to offer him a wife, and some sheep, if he would only stay and reside amongst them. On Mr. Smith expressing a wish to see come of the numerous wild animals whose footsteps were every where visible over the park-like mountains, they immediately despatched a party who returned

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with a splendid specimen of an ibex,* a civet cat, and a very fine ounce. He himself saw plenty of small game, such as antelopes, hares, foxes, guinea fowl, and partridges.

These hospitable mountaineers were well made active men, handsome in feature, and always well armed, their weapons being the same as those used by the Mahrahs. They are of the Gharrah tribe. Their females were certainly handsome, and much fairer than any we saw on the coast. I have seen as many as two hundred at a time, who came down to barter their flocks, ghee, and gums, for dates at Marbáat. Curiosity induced me to ask them how they accounted for being so fair, and their reply was, that it was owing to the tribe drinking milk from childhood, little dreaming that they were indebted to the renovating breezes and temperate climate of their native hills, on the summit of which, in February, the thermometer ranges from 49° to 72° Fahrenheit. The dress of the females consists of a coarse cotton petticoat, with a blue robe over it; their dark hair, as usual, artificially lengthened, and arranged in long narrow twisted plaits.

Mr. Smith found the botanical productions of Subhan the same as those in the more elevated parts of Sokotrah. The dragon's-blood, frankincense, and aloe were seen in abundance.

We now return to the Tehamah, or low land. The first village near the sea to the eastern of Ras el Ahmer is called Audad, having the principal village of Sallalah, about one mile N. E. of it, with a population of 300 to 400 souls. The village has a fort for its protection, and a "Jami" or Friday's mosque. It is surrounded with gardens, date-trees and jowari fields, with some wheat, cotton and indigo, and the soil is abundantly irrigated, either naturally or by artificial canals from the neighbouring lakes.

The next village near the sea shore S. E. of Sallalah is Haffer, in lat. 16° 57′ 30″ N., and long. 54° 11′ 00″ E., about a mile and a half distant, containing a population of about 100 men. Two and a half miles from Haffer to the E. N. E. is a freshwater lake, formed by a strong stream, near which extensive ruins are to be found. The lake is deep, and thickly covered with bull-rushes. We here found

* I have the horns by me, as a splendid specimen; they are three feet in curve with twenty one knobs.

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abundance of wild fowl, but a little judgment was required to drop your bird clear of the almost impenetrable belt of rushes. Indeed, in endeavouring to obtain some wounded birds, much amusement was afforded to the inhabitants, who laughed heartily at the awkward attempts made by the officers to extricate themselves.

About a mile and a half inland and two and a half to the N. E. of Haffer, is the village and white mosque of Robat, with a population of 100 or 200. The whole country surrounding the above mentioned villages is cultivated, producing cotton, indigo, jowari, bajree, and a few vegetables, but no fruit. They apparently care little for either of the two last-named articles, their accustomed diet being milk and jowari bread, with occasionally meat.

Three miles to the E. N. E. of Haffer is the fort and village of Dyreez, having a population of about 150 souls. The village has a salt lake immediately to the eastward of it, and from this proceeding in an easterly direction towards Marbaat, you lose all traces of cultivation, until you reach the village of Thagah, which has a small population, with a date grove and some cultivation to the westward of it. There are also several ruined forts near the hills, which at Thagah approach the sea. Thagah is in lat. 17° 00′ 40″ N., and long. 54° 30′ E.

The extensive plain of Dhafar is bounded on the west by the high mountains of Seger, and to the east by Gibel Subhan. To the north, each of these mountains gradually decrease in elevation, whilst the sea face is skirted by a low sandy beach, having regular soundings, and good holding ground from ten to four fathoms. During the north east monsoon the gusts of wind off shore from the north and west are very violent at times. The sea coast continues low and sandy until within seventeen miles of Marbaat, when it is terminated by a dark precipitous bluff of moderate elevation.

Trading boats now frequently touch at the villages along the shore of Dhafar, and barter dates, rice and cloth for gums, ghee and grain; and as this coast forms the sea face of the gum country, it might by a good system of government, and an industrious population, be rendered a most flourishing place. This fact did not escape the notice of Syud Akyl, a celebrated chieftain on this coast; and had providence ordained him a longer life, the now neglected plain of Dhafar would

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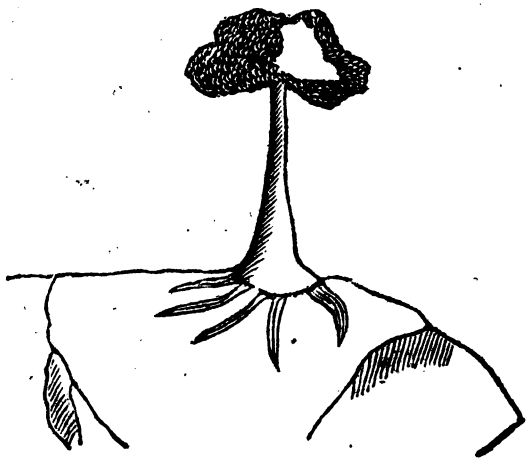
doubtless have presented the appearance of opulence and bustling activity which characterised it in former ages.

The frankincense and gum Arabic annually exported from Morbaat and Dahfar vary from about 3,000 to 10,000 maunds, which is nothing to what might be procured, the trees being exceedingly numerous on the mountain slopes and valleys inland, and attaining a height of fifteen to twenty-five feet; the bark is of a greyish colour, easily pierced, and the leaf large. In its neighbourhood is found the "Sulbur" tree of Sokotrah growing out of masses of primitive limestone, apparently without any earth to nourish them. Their height averages from three to fifteen feet.



The inhabitants of the villages in the plain appear to have but little intercourse with the Bedouins of the interior, who only visit them for purposes of trade. The people of the plain are of mixed blood, owing to the influx of settlers during the time of Sayyad Mahommad Akil. They are (as most town-bred Arabs) timorous, indolent, and much addicted to the use of tobacco. The dress of the higher orders is that commonly worn by all respectable merchants, viz.—a white robe bound round the waist with a shawl, and a fotah, or waistcloth. Their heads are shaven, and protected by the customary "amamah," or turban. The

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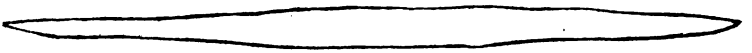
poorer classes wear merely the fotah, secured to a neatly plaited leather belt, the workmanship of the Bedouin girls, called Akab, which is lightly secured round the waist; when out of their houses they wear the yambe.

The Gharrah Bedouins who are the roving rulers of the country, prefer their glens and mountains to the hotter Tehama,—wandering from spot to spot as the pasture serves for their cattle and flocks,—employed during the S. W. monsoon in collecting gums, and residing frequently in the cavities of the limestone mountains. They are fine athletic men, dressed in a blue glazed waistcloth, which is in general their only covering. Their arms are the matchlock, zambe, and short straight sword, but some who cannot afford to purchase these weapons, arm themselves with a piece of very hard heavy wood, shaped thus:



which they throw with great precision one hundred feet—indeed, at that distance they would kill a man. It is thrown so as to ricochet along the ground, and every lad has one in his hand. They allow their hair to grow long, when it is gathered up behind like the Mahrahs, and this gives them a wild appearance.

Immediately before the fast of the Ramazan, both males and females visit the Tehama for the purpose of barter, and it was then that we had an opportunity of judging of them.

It struck me that their women (who were modest, though their persons were scarcely covered), and their young men had a Jewish cast of countenance. Their faces were longer than Arab faces generally are, their eyes large and bright and they possessed figures that would have delighted the eye of a Canova, could he have seen them. They were much fairer than the Arabs of the coast, and were apparently pleased to see men stouter and fairer than their own tribe. Indeed, they were frequent lookers-on at my crew, when playing at cricket, and I then had forty-five extra Europeans on board, having saved the crew of the "*Reliance*" whaler, that had been wrecked on one of the Curia Muria Islands.

The Gharrah Bedouins seldom eat meat, excepting on festivals; not that they dislike it, as their favorite dish is a young camel,—but they

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value the milk too highly to slaughter the females of either camel, cow, or goat. The males of the two latter they frequently dispose of on the coast, for dates, cloth, &c.

As I before observed, the district of Dhafar would doubtless have flourished under the government of Sayyad Akil, and has annually deteriorated in value since his death, which occurred in 1829; and as this chieftain has been conspicuous and much dreaded, I shall devote a few lines to a description of him—the manner in which he used to be held at an early period of his life in detestation, and in his latter years with veneration and respect.

The Akil family were merchants. The brothers Sayyad Mohammad and Abdur Rahman were in the habit of trading in a large bugula belonging to their father, which gave them a predisposition for a roving life; and as Dame Fortune favored their speculation, they increased the number of their vessels, and purchased five hundred slaves from the Mozambique. In one of their voyages, Sayyad Mohammad visited Dhafar: the luxuriant appearance of the country tempted him to settle there, and gradually he rose to be supreme. With his large retinue of slaves, assisted by his personal ability and bravery, he defeated the Gharrah tribe in every instance, and was latterly much dreaded by them. Under his just rule, the district flourished, and trade and population increased. He extended his conquest as far as Morbaat, and there built a fort for the protection of the town. Ambition and avarice, united with his predilection for a roving life, led him to commit piracies on the high seas; and his vessels, amongst other prizes, captured an American ship in the Red Sea, murdering all the crew with the exception of one boy, whom he had carried to Dhafar, and educated in the tenets of the Mahomedan faith. When we arrived at Dhafar, this young man had nearly forgotten his mother tongue. He was a Mahomedan, and had a wife and several children, and seemed perfectly contented with his lot.

After some years of cruelty and plunder, the Sayyad's conscience smote him, and he suddenly gave up the sea, and settled quietly in Dhafar, anticipating the comforts of a quiet life, and anxious to make others happy; but here he was disappointed. The Gharrah tribe deceived him, and for a time led him to imagine that they were contented with the justice of his government. They traded freely with the Tehamah,

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and apparently all animosity between them was buried for ever. This calm lasted from 1806 to 1829. The district still improved, and even Morbaat could number a population of perhaps 2,000 souls. The bold rover, with his mode of life had changed his habits also. He became devout, and averse to shedding blood; was loved by his subjects for his impartial and mild rule, and dreaded by his enemies. Treachery, however, had long been at work, and opportunity alone was wanting for the Gharrahs to take their revenge for many acts which they deemed tyrannical and oppressive. Moreover, there were many others between whom and the chief existed the death-feud for relations who had been slain by his followers, and these eagerly joined the cabal against him.

The long-wished for opportunity occurred after the month of Ramazan, in 1829. The Sayyad, returning from Morbaat with a smaller retinue than usual, was mortally wounded by a matchlock-ball fired from the low jungle. On his falling, the slaves immediately fled, and the Bedouins who formed the ambush then completed the murder. The body was afterwards found by a strong party sent out to recover it, pierced with numerous wounds from their creeses, or yambes.

The Imaum of Muscat, hearing of the death of Sayyad Mohammad Akyl, sent a force to keep possession of the territory for the brother of the deceased, Sayyad Abdur Rahman, who still was a merchant, and at that time in Bombay. But when he heard the particulars, he prudently declined the proffered honors of so unsatisfactory a government, and preferred the more peaceful and profitable calling of a merchant, which calling he still exercises at Mocha, where he is distinguished for his intriguing disposition, as well as for his great wealth.

The Imaum of Muscat requiring troops for the settlement of his southern possessions, the force at Dhafar was withdrawn, and the district once more fell under the rule of the Gharrahs, who soon drove away the greater part of the inhabitants by a system of plunder and monopoly, and thus the villages have dwindled into insignificance.

Immediately east of the cliffs, to the westward of Thakah, the soundings on the coast become deeper, with alternate cliffs and small sandy beaches. About seven or eight miles to the westward of Morbaat is a small rock called Jawagi (Husein) having some ancient ruins of hewn stone on its summit, and separated from the main land about fifty yards.

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The length of the rock is about 300 feet, by 200 broad. Tradition says a bridge formerly connected it with the main.

MORBAAT (or Merbat) is a small village* in lat. 16° 59′ 15″ N., and long. 54° 47′ 40″ East (allowing Bombay as before stated), situated in the centre of a small but well-sheltered bay named after it, containing about fifty houses, and a population of 150 to 200 souls, who may be divided into three classes, viz., 1st, a few Arab merchants, not born there; 2ndly, Arabs who are either descended by the mother's side from the Gharrahs, or who have married Bedouin wives; and 3rdly, the slave population, the females of which are not celebrated for their modesty. The governor, or sheikh, when I was there in 1835, was Ahmed of the Makyat branch of the Gharrah tribe,—a strong, well made man, five feet seven inches in height, and thirty-five years of age, with good features, and a benevolent countenance: I experienced great civility and politeness from him. He was true to his word, and extremely obliging, which much facilitated my work.

In return for his kindness, I presented him with a rifle, thirty German crowns, and some cloth. The population we found indolent in the extreme, addicted to smoking and lolling at their ease. They possessed no vessels, not even fishing-boats, and were too lazy to make catamarans. One of the younger merchants there purchased a boat from a bugala whilst we were there, with the money he had amassed to pay for a wife, which speculation turned to good account, as I employed him to water the ship. The men who managed her were, however, landsmen, and once they were driven so far to leeward that I, in charity, picked them up.

The houses in the village are miserable hovels; those that are inhabited are erected on a rising ground, immediately to the southward of the landing place, having to the S. E. of them a small square ruined fort, and to the north one of much larger dimensions, built by Sayyad Mohammad Akyl, surrounding which are the remains of numerous houses in ruins.

There are the remains of another village near the base of Gibul Ali (a red granite hill near the beach in the depth of the bay,) which ap-

* Geographical site by numerous observations. By 30 azimuths in 1834, I made variation 3° 12′ W. In 1836, variation by 62 observations on shore was 2° 57′ W. High water at 8 or 9 hours, rise and fall 6 feet 10 inches.

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parently surrounded a tomb dedicated to the patron saint of the place, and now called Kubbat Sheikh-ibn-Ali. On the extreme point, forming the south side of the anchorage, are the ruins of another tomb called Kubbat Sheikh Hydroos.

Both the population and vessels are supplied with water from holes dug in the sandy soil of a small valley near the hill of Gibul Ali. It is brackish and unpalatable at first, but after a time we became accustomed to it, and never found it to possess any pernicious quality.

Morbaat affords but few supplies. All we obtained were goats and bullocks that were sent for from inland, and a few radishes and onions from Dhafar. Wood is brought from the mountains.

MORBAAT, or MERBAT BAY, is a small secure and well-sheltered anchorage for 24 points of the compass; but from south to west it is open. The low and rocky point to the southward, called Ras Morbaat, has a sunken rock off it, at 300 yards distance.

The Bay turns suddenly from the pitch of the point in a northerly direction, having two or three small points and bays, ere you reach that upon which the present village is erected, and from thence the deepest bay of any forms the landing-place; and after passing the watering-place, it turns gradually in a western direction towards Dhafar.

During the N. E. monsoon the water is as smooth as a mill-pond. The soundings extend off-shore but a short way; and a vessel will quickly shoal from thirty to ten fathoms, between which and five fathoms, 500 to 600 yards off shore, is the best anchorage. I generally anchored in six or seven fathoms off the village.

A leading mark for making Morbaat, used by Native navigators, is Gibul Dekan (or Gibul Morbaat) as they term it, being nearly true North from Ras Morbaat. The peak is nothing more than an elevated part of the Subhan range, from which the mountains rapidly decrease in height in a westerly direction, thus rendering it a conspicuous object from seaward.

The revenues of Morbaat are trivial, but the sheikh receives a present from most vessels anchoring in the port, which enables him to pay the annual stipend of seventy dollars to his tribe, and to live respectably himself. He also levies a small anchorage fee (nominally)—in proportion to the size of the vessel, and the will and liberality of the Nacodah. I have known one, two, and three bags of dates given, and sometimes a

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bag of rice. The power of the sheikh extends nominally from Thakah to Ras Nus; but I doubt if he would attempt to inflict fine or punishment upon any but a townsman.

Whilst surveying and examining this part of the coast, I took the opportunity of ascertaining the number of vessels that annually supply the S. E. and Southern Coast of Arabia with dates; and a close estimate is therefore deduced of the immense quantity brought from the Persian Gulf and Muscat. It will also show that any strong Naval power could almost cause a famine, or rather starvation, to the inhabitants.

This idea struck me whilst conversing with some of the more intelligent merchants upon the quantity supplied. They expressed no surprise at my having calculated the quantity; but were much astonished at my concluding remark, as to how easy it would be to punish the inhabitants of the South coast for any offence they might commit, by blockade, which would inevitably be severely felt, almost to starvation as the growth of dates on their coast would not supply one-twentieth, part of the population. When they clearly understood me, one of them exclaimed, "That is not the idea of a man but of the devil; for into man's imagination such a thought for the wholesale destruction of his species never could enter. Say no more about it, for dates are bread, and bread is the principal support of life."

The season for the trading boats running down the Arabian coast from the Persian Gulf, is from the beginning of November to the end of December. From the 21st November to the 10th December forty boats anchored in Morbaat Bay, all laden with dates, and varying in size from 30 to 150 tons; and 121 boats were spoken passing the port, varying from 30 to 300 tons, which is about one-half the number for the season, so that the whole may be about as follows:

		Tons.
In 18 days 40 boats anchored with dates.	Average 80 tons.....	3,200
In 18 days 121 vessels passed with dates.	Average 80 tons.....	9,680
	Total.....	12,880

This amount I witnessed; but consider the remaining days in the two months above quoted would make the annual supply little short of 25,000 tons.

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The larger class of boats return before the S. W. monsoon, but others, well equipped and with a navigator on board, return with the "Tadhbirah" in June, or after the first blast of the S. W. monsoon has blown upon the coast, their cargo being principally coffee. The smaller craft, called bedans, bakarahs, batillahs and trankis, of the Moserrah and Sur districts, make coasting voyages, and employ themselves in fishing along-shore, returning with the current in March or April. I have met them in fleets of fifty or sixty, with from eight to ten men in each boat, and do not hesitate in saying that they plunder whenever an opportunity offers without personal risk. As a proof of this, I may mention that whilst carrying on a trigonometrical survey of the coast below Ras Isolette, I had left the ship at 3 A. M. in my launch and cutter, accompanied by Lieutenant Sanders and Mr. Midshipman Fleming, with the view of commencing my work about eight miles to the northward in Jinzerah Bay by sunrise. When we were about four miles from the beach, and it was still dark, we crossed a large bukarah on the opposite tack, and spoke her in passing.

The cutter being some distance astern, with only Lascars in her, my attention was naturally attracted to her, as I doubted the honesty of these trading crafts much; nor was it without reason, for the bukarah wore round and stood for her. We immediately bore up to the assistance of the Lascars, and when close, received a volly of matchlocks from the bukarah, which we returned, and stood for her. Finding that we were well armed, and not inclined to be intimidated by her fire, she took to her heels. I ordered the cutter to keep on his off-shore side, whilst I pulled and sailed in the launch in his wake, keeping up a fire of musketry. My object in so doing was to keep him in-shore close to the high breakers, and as the day dawned, for the surveying vessel to open fire upon her and cut off her retreat, as she was too fleet for us. As daylight dawned the Nacodah of the boat found himself in a most awkward predicament. On his larboard bow was the *Palinurus* within half gun-shot; on his starboard bow and beam heavy breakers; close astern the launch, firing at him; and on his larboard quarter the cutter. He was so hemmed in, that his only alternative was to beach his vessel, which the second 9-pounder shot from the *Palinurus* compelled him to do, and all hands swam on shore. I afterwards sent the launch with a gun to destroy her; and complained to the Imaum of Muscat, whose subject owned the boat. He immediately took notice of it, and imprisoned the Nacodah and owner for life.

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Prior to quitting the subject of Morbaat, I would observe, that during the height of the sudden and dangerous blasts from the northward and westward (called by the Arabs "Belaat") which a vessel will sometimes experience in Curia Muria Bay, a strong south easterly breeze will be found blowing over the point of Morbaat during the day, and light and variable airs during the night, with smooth water. I account for this change of wind by the extensive precipitous wall of Subhan, which forms a barrier on its south and east face, varying in elevation from 3,000 to 5,000 feet, and running in a N. E. by E. direction from Morbaat to Ras Nus; so that on rounding Ras Nus for Morbaat the wind diminishes in strength, and gradually blows parallel with the line of Subhan until the Wadi of Dhafar is opened, when the northerly and westerly winds rush down with violence. Owing to the same reason but very little rain falls during the year upon the rocky belt of land at the base of Gibul Subhan, and Morbaat rarely has the benefit of a shower; whilst to the westward the sides and summit of the Subhan range are covered with verdure.

Ras Morbaat, a low rocky point forming the southern part of Morbaat Bay, and S. W. point of the low belt of land, extending in breadth from six to twelve miles from the Subhan mountains. The extremity is very low, and a rocky reef extends from it about 400 yards. Caution, therefore, is requisite in rounding it, as the soundings are very bold—10 fathoms being close off the pitch of the reef, and 20 fathoms not 300 yards from it. It is in lat. 16° 57′ 50″ N., and long. 54° 47′ 26″ E.

From Ras Morbaat to Bander Gingeri the coast is low, rocky, and irregular, forming several small sandy bays, with rocky points and small isolated rocks close to them. The soundings are deep, having in some places 100 fathoms within a quarter of a nautical mile, and 30 or 40 fathoms within 200 or 300 yards.

Bander Gingeri is a small sandy bay to the westward, and immediately under the high conical hill bearing that name. It is 2¼ miles broad at the entrance, and 1¼ deep, affording shelter from easterly and north-easterly winds, but open to the southward. This bay has irregular soundings all over it, varying from 8 to 12 and 16 fathoms, overfalls with a bottom of rocks and sand; and in the centre, on a line drawn from point to point, it has 26 fathoms, with deep water outside the bay.

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GIBUL GINGERI, a remarkable conical hill, close to the sea, of 1,300 feet elevation, composed of limestone, with veins of chalk and gypsum traversing its southern face, with specimens of shelly limestone on its summit. Lieut. Jardine, I. N., an officer whom no trifling difficulties, could deter from accomplishing the wishes of his superior in authority, succeeded in ascending to the summit of this steep hill, and from it obtained corroborating true bearings. The ascent was extremely difficult, and it was only by great perseverance that he managed to carry up the theodolite and sextant in safety.

Between this peak and Morbaat there is a very small bay, sometimes frequented by fishing boats.

To the north-eastward, thirteen miles from Gibul Gingeri, there is another hill, called Moseirah, of similar formation to it, with a rocky irregular coast line between. One valley (Wadi) with a little jungle, will be seen about half way between them; otherwise the same feature in outline extends to Ras Nus, the S. W. point of Curia Muria Bay, with deep water close to the shore the whole way.

The belt of low land from Morbaat to Ras Nus is called by the inhabitants "Sellah." It is bounded on its north side by the Subhan range, and on its south face by the sea. It varies in breadth from six to twelve miles, and extends N. E. by E., and S. W. by W. thirty-six nautical miles.

The whole of this rocky belt of land is desolate in the extreme. Scarcely a vestige of vegetation is to be seen; but in the hollows of the water-courses, the antelope and hare manage to pick a scanty subsistence; and near Ras Nus, in a ravine, some date-trees are growing up that owe their existence to the mountain streams which, after heavy rains, force their way to the sea.

Before leaving the Country of Frankincense, which I consider to commence at Ras Fartak terminating at Ras Nus, I would observe that the whole feature of the country is high tabular limestone, varying in elevation from 3,000 to 6,000 feet, extending through Hadramaut to the confines of Yemen.

The Curia Muria Islands, I am aware, have been in former days called the Isles of Incense; though, with what correctness, will be shown

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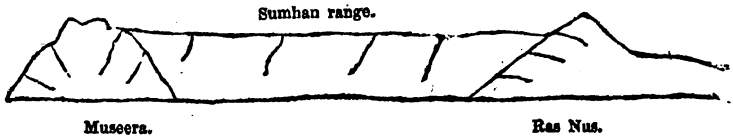
as my description of the coast and islands proceeds. Should I be wrong in fixing Nus as the boundary. Ras Karwan, or Saukirah, would be the north-easterly termination of the Frankincense Country.

Ras Nus, a prominent cape, forming the S. W. point of Curia Muria Bay. The point itself is low, but has immediately over it a high mountain, running from the S. W. and N. E. like a quoin, the highest and most precipitous part being near the sea, somewhat like a bluff, thus—



Immediately S. W. of Nus is a large mass of rock near the sea shaped like a tub. The formation of the mountain of Nus (which is 1,200 feet in height) is granite, the cape being a low point of a small boat anchorage named after it.

Bander Nus, a small anchorage formed by a slight concavity of the coast, between the point of Nus and a slightly projecting rocky point called Ras Samhor, which has a small reef off it. Shelter is here found from southerly and westerly winds, but the anchorage is close to the shore. Our tender anchored in nine fathoms, sand and rock, about five hundred yards off, with the point of Nus S. 50° E., and near the date-trees, which are the mark for a spring of good water, from which coasting vessels frequently supply themselves. The spring is sufficiently abundant to supply two and three vessels in a day; and firewood is procurable from the ravines in the neighbourhood.

The population near the sea is scanty; indeed, on this part of the coast, we found only a few half-starved wretches, who called themselves servants of Nebi Saleh ibn Hud, to which office they appear to attach considerable importance, and are highly proud of it. Their poverty may be accounted for by their being chiefly dependent upon the generosity of travellers for their subsistence. They are poor creatures, nearly naked, and living in hovels loosely constructed of stones, and covered with sea-weed, and the leafless branches of small trees—of a circular form, and very low.

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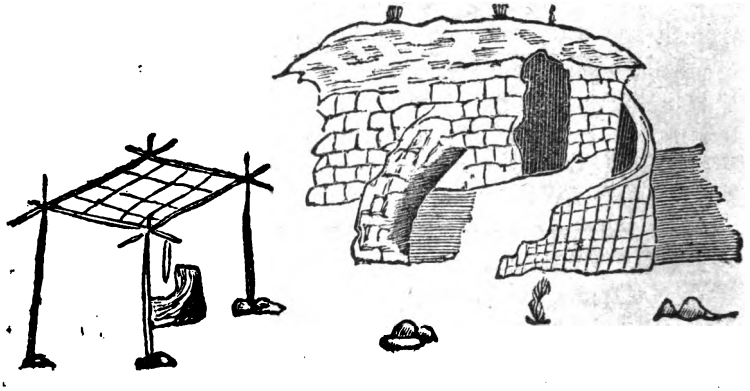
The subjoined rough sketch of one of their huts, which exactly corresponds with the description given of them by Ibn Batuta in the fourteenth century, will best show the style of dwelling.



The sanctity of their office apparently did not enable them to withstand the temptation afforded by my launch, which, with some officers and ten men, spent one night at Hasek, as on their departure in the morning they discovered that not only their three cooking pots had been stolen, but the remains of their provisions, consisting of biscuit and salt pork, which these zealous followers of the Prophet devoured without scruple; thus rendering the old adage good that "where ignorance is bliss, 'tis folly to be wise." No doubt, had they known it, a few prayers offered to the shrine of their patron saint would have sufficed to place their consciences at rest.

Ras Samhor is a low rocky point, forming the northern extremity of Bander Nus, and having two small rocks a few yards distant. The tomb of Nebi Saleh ibn Hud is erected in a small valley between Ras Samhor and Ras Hullan, about one mile from the sea. The edifice is in lat. 17° 16′ 30″ N., long. 55° 21′ 40″ E., and has been of superior construction.

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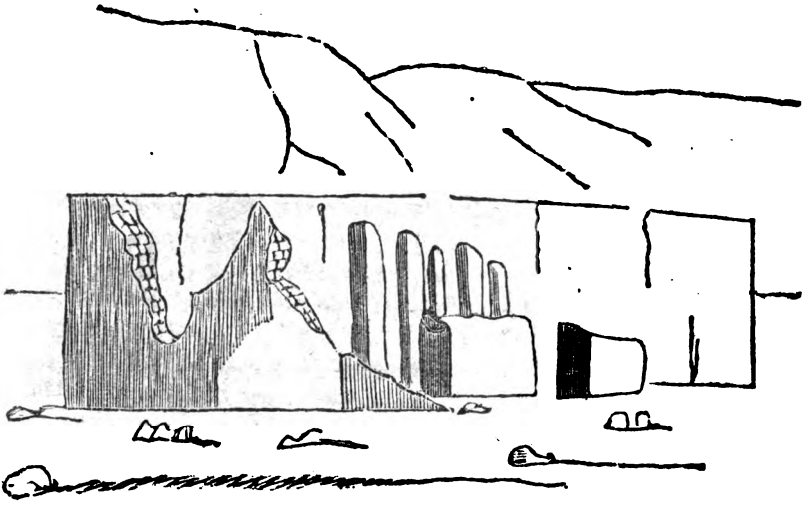

It is fifty feet long, and of nearly the same breadth. Its roof was originally supported by sandstone pillars, and hewn blocks of the same kind of stone formed its walls. The whole now exhibits the mouldering stamp of time. It is said to have been a place of worship, and prior to the time of Mahommed, pilgrimage was made to the shrine from all parts—at least so says tradition. Saleh ibn Hud must have lived about the time of Abraham, after the destruction of the tribes of Thamud and A'd. The respect formerly shown to the remains of the saint has much diminished. But few visit the shrine, and they are coasting traders, who are attracted by curiosity rather than reverence. The Gharrah tribe make an annual visit to the tomb, to thank the Prophet for their enjoyment of all earthly comforts, which, according to their ideas, consist of women, children, and their flocks.

The tomb itself, supposed to contain the prophet's body, is twenty-three feet in length by four in breadth, and is constructed of fragments of white limestone and madrepore, plastered with clay and cement. The servants approach the last resting-place of the departed saint with great reverence, walking slowly round it three times, and frequently inclining their heads, so as to press their lips on the tomb. Prayers are repeated as they walk round, which being finished, they slowly retire, and make a last prostration at the door.

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RAS HULLAN is a low rocky cape immediately to the southward of Ras Samhal, and bearing from it S. 25° W. true.

RAS SAMHAL is a low rocky point on a transit line with Ras Nus and Ras Hasek. It takes its name from Wadi Samhal, a well wooded valley, having a fresh water spring, and a pool of brackish water near the sea. The three above mentioned capes are merely slightly projecting rocky points, close to each other, and forming the irregular outline of the coast between Nus and Hasek.

RAS HASEK is a low projecting rocky point in lat. 17° 21′ 35″ N., and long. 55° 22′ 50″ E., forming the south point of Ghubbet el Dhum. It affords a shelter from southerly winds for boats that have occasion to anchor at Bander Hasek. The bay forming Bander Hasek is very small, and the soundings do not extend off shore 400 yards, at which distance I could not find bottom at 130 fathoms. A short distance from the centre of the bay and in a valley, are the ruins of the ancient village of Hasek, with the stumps of a few dead date-trees, and a well of brackish water. Some of the people here were entirely without clothing, living exclusively on fish, and wretched in the extreme. Immediately to the southward of Ras Hasek, in a slight curvature of the coast, is a plain called Suk Hasek, from its having been the market place when Hasek flourished. This curve in the coast is sufficient to shelter two or three boats from northerly winds.

An inlet of the sea (the bed of which is now a marsh, separated from the sea by a belt of sand, the accumulation of centuries) once existed in Wadi Hasek, and in all probability formed its ancient port, as its waters would almost wash the base of the old ruined town. A few stunted date-trees are scattered over its surface, and the bed of the valley higher up is densely filled with the acacia, tamarisk, and other small trees. The slopes of the mountains produce the Luban, or frankincense-tree, which is collected in small quantities by the Bedouins when the season arrives.

The coast from seaward bears a wretched appearance, not the slightest marks of vegetation being perceptible to the eye. On shore, however, the valleys are found to be well wooded, and having either wells or a rivulet of fresh water. To those who prefer grandeur and sublimity to the softer features of nature, the solemn curtain-like appearance of these limestone mountains and the sharp peaks of the granite ranges (one of

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which, Gibul Habarid, attains an elevation of 4,000 feet) present themselves here in a most picturesque form ; but the sailor, and still more the surveyor, weary of seeing the same barren peaks, prefers the sight of green trees, and sighs for a verdant plain where he can stretch his limbs, after months of confinement on board a vessel where his space is limited to 26 by 96 feet.

CURIA MURIA BAY.—Ghubbet el Dhum is a bay on the west side and within Curia Muria Bay, having Hasek for its southern point, and Ras Montejib for the northern boundary. The land surrounding it is high, precipitous, and tabular, having in it three conspicuous ravines, one of which called Rekot is the principal, and said to extend to the confines of Hadramaut, and the Subhan range as its southern boundary.

As far as we examined, the valley appeared thickly wooded, and apparently well watered. The breadth of the water-course, and the huge masses of rock that have been swept down, fully attest the strength of the torrent that follows a heavy fall of rain.

At the entrance to the Wadi, we discovered a spring and a lake, the latter, from its neighbourhood to the sea, brackish. It apparently was the remains of the rain-water, mixed with the sea-water that had percolated through the sand. During the rains, this watercourse would doubtless be a river discharging itself into the sea, which accounts for the "Prim" river, that is marked in the old maps and charts, in this vicinity. Some wild ducks and widgeons were shot on its banks.

At the extremity of Wadi Recot, or Dhum, which the Bedouins stated was seven days' journey (140 miles) from the sea, we were told it opens upon a fine and fertile country, abounding in all the luxuries of life—which, according to Arab ideas, I conceive to mean jowari, Dhourra wheat, date groves, and abundance of water to irrigate the soil, and bring forth the harvests without any great exertion of manual labour.

The country is called Jezzar, and is inhabited by a sub-division of the Mahrah tribe. The principal town in this fertile district is called Jezzar also, and there is another large Bedouin station at three days' journey from the sea, or about sixty miles. The mountain tracts *en route* to Jezzar are also fruitful, yielding abundant pasturage for the flocks and herbs that form the chief wealth of the inhabitants.

RAS MONTEJIB is a bluff headland slightly projecting from the Bay of Ghubbet Dhum. From this the coast takes a turn more northerly until

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it reaches the sandy beach, which extends for fifteen miles E. N. E. to the westward cliff of Shuwamiyah.

Ras Shuwamiyah.—There are two bluffs of this name, neither of which deserve the appellation of capes, being only slight projections distant 10½ miles E. ½ S., and W. ½ of each other. The coast between is a table-land of limestone cliffs, from 400 to 600 feet in height. The western bluff is the darkest land surrounding the bay, having some trees, and fresh water close to it near the sandy beach abovementioned. The eastern bluff bears from Ras Minji S. 83° W. true, distant 10¾ miles. The whole coast is bold, having 12 and 15 fathoms within 500 yards of the shore.

Ras Minji is a slight projecting bluff, nearly 700 feet high. Close to it, to the eastward, we found a pool of fresh water near the sea. The soundings between Ras Minji and Shuwamiyah are bold, with overfalls. This forms the boundary between the Gharrah and Jenabi tribes.

Ras Karwau is a low, black, slightly projecting, and rocky cape in lat. 17° 53′ N., and long. 56° 22′ E., from which a sandy beach commences extending in a westerly direction, in a straight line about seven nautical miles. The cape is nearly insulated by a salt water lake, at the head of which the water is fresh.

In the vicinity of this lake, we found a few poor Jenabi fishermen, with their families, residing in excavations of the rocks, subsisting entirely on fish, but possessing a few goats and sheeps that grazed on the mountains, tended by the females. I employed them to procure wood and water for the vessel, and wished to pay them in crowns, but they preferred coarse blue and white cloths and rice. In the neighbourhood of this lagoon we found hares, foxes, partridges, plovers, ducks, and widgeons.

Native crafts running down the coast with dates, frequently anchor for shelter off the low sandy line of coast to the westward of Sherbedat, and it has therefore obtained the name of Bander Sherbedat. It is a good anchoring ground all along from five to ten fathoms, but on approaching Minji bluff, the bank deepens suddenly from seven to thirty fathoms. Inside 10½ fathoms the bottom of sand, but outside it becomes rocky.

During the Belad, or northerly winds, which blow with great violence, a vessel coming from the north-eastward should round Ras

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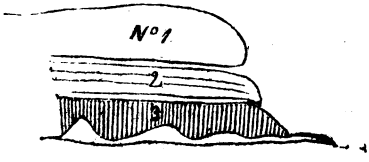
Karwau very close, and be prepared for strong gusts,, both in rounding, and working in towards the anchorage off the pool. A large mangrove-tree near the pool affords a conspicious mark for knowing the position of it.

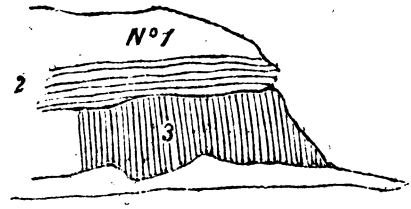
Ras Sherbedat, the eastern point of Curia Muria Bay, is a steep projecting bluff in lat. 17° 53′ 13″ N., long. 56° 24′ 47″ E. It has an even table surface, and steep precipitous sides.

Sherbedat and Karwau are well known, and much dreaded by Arab navigators from the violent gusts frequently experienced off them, often occasioning the loss of mast, sail or yard. These blasts may be expected from the end of October to the beginning of March from N. N. E. to W. N. W. I have rounded the bluff with double reefs on the cap and fore topmast staysail, which was as much as the vessel could stagger under. But after opening Sherbedat Bay, we were always able to work into the anchorage under close reefs and courses.

The height of Ras Karwau is about 800 feet. Its composition nearly the same as Sherbedat, as follows.



Sherbedat.



Karwau.

No. 1. A species of sandstone, more or less compact and imposed upon No. 2. which is a horizontal stratum of chalk with masses of flint imbedded in it, and also in veins or seams. The stratum is about twenty-five or thirty feet thick, and has many fossil remains.—No. 1 varies in thickness from five to ten feet, and in some places between the two strata are contained beds of shells, coral, and other marine productions. The summit of Ras Karwau appears to be composed of tertiary limestone with fossil remains.

Having thus far attempted a description of this extensive concavity in the line of coast, called by Arab navigators Ghubbet Curyan Muryan, I will proceed to describe the islands and dangers which are situated on

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the outer edge of the bank of soundings running from the north shore, which is twenty-six or twenty-seven miles distant, and forming therefore the outer barrier to this extensive bay.

JEIZRAT KIBLIYAH, the eastern island and third largest of the Curia Muria group, is nearly two miles long, one and a half broad, and five miles in circumference, forming in all views several peaks which are composed of primitive limestone, more or less allied to granite. It is rocky all round, with the exception of a sandy nook to the eastward of the N. W. point in which we were able to secure our boats.

The highest peak is 550 feet above the sea, in lat. 17° 29′16″ N., and long. 56° 24′ 22″ E. It is a mere barren rock, visited by a few birds of the gannet species. Its other occupants are every thing almost that is disagreeable to man, and they thrive well; snakes, rats, mice, scorpions, and centipedes innumerable. We found some graves, and also some skeletons exposed in positions as if the poor creatures had perished from starvation. This supposition was partly confirmed afterwards by the inhabitants of Hullaniyah Island informing me that a ship and a bugala had been wrecked there, and that in consequence of their not being able to render them any assistance, owing to their having no boats, the crews miserably perished.

FOUR-PEAKED ROCK.—A small rock so named by me from its outline, situated N. W. from the N. Westerly point of Kibliyah, distant from it 1,280 yards, with a rocky channel between them having two and three fathoms. It is elevated about 100 feet above the level of the sea, and has a shoal reef extending three quarters of a mile from its N. W. end, on which are four small rocks dry at all tides, and several parts of the reef dry at low water springs.

WELL ROCK, a small rock situated off the S. W. part of Kibliyah, distant from it 800 yards, with a channel of seven, eight and twelve fathoms water between at the distance of a few yards from the rock in a south easterly direction. The rock derives its name from a natural well on it, in which we found salt water of a beautiful pink colour, which I imagine is thrown up during the S. W. monsoon.

Dangers off Kibliyah.—There is a small and dangerous rock even with the water at low tide, situated to the eastward of this Island. It bears from the highest peak E. 11° *S. true*—and is 7728 yards distant from the island by trigonometrical measurement. Within a few yards of it, the

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cross transits are Four Peaked Rock, in one with the north end of Kibliyah —and Well Rock on, with the south end of Hullaniyah. Vessels should be cautious in rounding this island at night, the soundings being a bad guide, and with a vessel in a breeze, there would be scarcely time to discover the dangers, particularly as the breakers on the rock are not always visible. Between the rock and the island the least water is nine fathoms. Two miles to the north ninety-five fathoms. One mile and a half to the south, sixty fathoms, and to the eastward 170 fathoms at a distance of two miles and a quarter. The channel between the islands of Hullaniyah and Kibliyah is perfectly safe, with from 20 to 46 fathoms, and without danger unless close to the islands.

JEZARAT HULLNAIYAH, the largest of the Curia Muria Islands, being 7¾ miles long by 4½ broad, and nearly 20 nautical miles in circumference. It is composed almost entirely of different coloured granite and limestone, is mountainous and entirely barren; indeed, on its western side scarcely a bush was perceptible, but on its eastern face we found a few wild flowers and a little grass, which served as subsistence for 30 or 40 wild goats, Wood is a scarce article, the largest and in fact only tree being the tamarisk. We found three wells of indifferent water, and a fourth for our own consumption, which the inhabitants immediately designated as the "Bir Inkiliz."

In the vicinity of the best well on the northern side and about 1,000 yards distant from the "Bir Inkiliz," we found, while digging some feet under the surface, 2 tompions and some oaken bucket staves, from which I should conclude that it had been dug by some whaler. This well is in the N. E. bay called Ghubbet er-Rahib, in a valley known as Kaset el Wadi. The other wells are situated towards the eastern side, one to the northward and one to the southward.

The eastern and western ends of Hullaniyah terminate in comparatively low points, whilst the centre is filled up with close ranges of granite mountains, the highest part of which is 1503 feet above the level of the sea, forming a cluster of chimney peaks closely united. The north-east end forms a majestic bluff of 1645 feet in height, being the most lofty part of the island. This bluff forms the N. W. Point of the N. E. bay called Gubbet er-Rahib. It is steep, too, and there are 12 and 13 fathoms close to the rocks.

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Hullaniyah is the only island of the group that is inhabited. Its population in 1835 consisted of the following families, viz.—

Sennaar ibn Saad ibn Ali ibn Salem.

Jumeera.....	his wife.
Salem.....	his son.
Majoon.....	his daughters.
Ayesha.....	
Saida.....	

Khin ibn Salem ibn Mohammed.

Gonnoord.....	his wife.
Mahommad.....	his son.
Gidhat.....	his daughter.

Mobarek ibn Salem ibn Soon, with one son Ahmed, aged ten years.

Sayyad ibn Ali ibn Mohammed, (unmarried.)

Mobarek ibn Ahmed ibn Saad ibn Mobarek ibn Ahmed ibn Salem.

Gurzulla.....	his wife.

Naami ibn Esaa ibn Sayyad Ali.

Shumsah.....	his wife.
Salem.....	his son, aged four years, and one daughter.
Sultana.....	a widow.
Saad.....	her son.
Guherra.....	her daughter.

Salem ibn Sayyad ibn Mobarek.

Total—7 men, 5 children, 5 women, 6 girls;—in all 23 souls.

I found the poor people inoffensive and civil. The men were of small stature, the women stout and all very plain. They calculated upon one death annually, which did not happen in 1835, whilst one birth was daily expected, and did occur before we left the islands, which gave an increase of one male. This, however, is not likely to continue, as the women are considerably past the bloom of youth. They have no idea from what part of the coast they originally came, or whether they belong to the Jenabi or Gharrah tribes. It is most probable that they belong to the latter, and that they originally came from Hasek. They profess Mohammedanism, but they are not very scrupulous observers of the tenets of their creed. Indeed, we saw but one who knew his prayers. Their huts are of loose stones, either

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square or circular, about five feet in height, covered with seaweed. They change their habitations with the seasons, as the surf on the weather side is unfavourable to their fishing from the rocks. They have no boats or catamarans, though their daily subsistence depends chiefly, if not entirely, upon their baskets and fishing-hooks: when unsuccessful in fish, which is seldom the case as they are abundant, crabs and shell-fish serve them for food.

I presented them with white and blue cotton cloths, knives, needles, threads, and fish-hooks; and, during our sojourn amongst these rude and unsophisticated islanders, many an unusual meal of rice did they receive, which they divided with the greatest impartiality.

They grill their fish without scaling or cleaning them, and for weeks together this forms their only food. Sometimes they obtain a little tobacco from passing boats, which they consider a very great luxury.

On enquring why there appeared so many graves on different parts of the island (I must have seen 600 to 800), they could give no satisfactory answer, though the seniors remembered the Jowasimi pirates visiting the island in about 1816, plundering them of every thing, and carrying away a large part of the population which have never been heard of since. Since the Jowasimi pirates have been put down by the English, they have not been molested, but on the contrary, are enabled to obtain from vessels passing the island small and useful articles in exchange for their dried fish. The boats that touch here generally anchor in ten to twelve fathoms sandy bottom off shore, 500 yards abreast of a small sandy nook on the north side of the island, and about a mile and a quarter to the westward of two conspicuous sand-hills, that may be discovered at a distance of three or four leagues. They are about two and a half miles east of the western point of the island.

Besides the heavy craft that occasionally touch here, the island is sometimes visited by a boat belonging to the "Kalifan" family of the Mahrah tribe, who claim the Curia Muria group as their hereditary property. The principal of this family are—

Mohammed ibn Ali ibn Sayyad ibn Omar.
Mohammed Ali ibn do. do. do.
Narjeem ibn Ahmar.

Their residence is at Ghazir, and their periodical visit to the islands is for the purpose of claiming any ambergris that the inhabitants may

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have collected, as well as to obtain a large portion of whatever money they may have received in exchange for their fish. In return they are frequently rewarded with a little tobacco, dates and coarse cloths, the liberality of the donors generally being limited by the amount of tribute they may have succeeded in exacting.

The anchorage above alluded to is near the well on the N. W. side of the island, but completely open to easterly and westerly winds, and with the breeze from the northward. The island is a dead lee shore, any vessels, therefore, anchoring here must be prepared to start at a moment's warning. A small tender I had, saved herself during one of the violent "Belats" or northerly winds, by running between the sunken rocks off the west end of Hullaniyah, and anchoring under the lee of the island; and not twenty days afterwards, the vessel I commanded had to slip her best bower at forty-eight fathoms, and under close reefs, was only just able to weather the outward sunken rock.

The poor islanders, though separated from other nations for a considerable part of the year, and though able to exist upon their own resources, enjoy occasional opportunities of visiting the coast, though considered the height of temerity. Within the last few years a few have mustered sufficient courage to embark on board a trading boat, taking with them salt fish for barter, and I was present at the return of one of these bold adventurers, who landed amidst the wondering acclamations of those with whom he had spent his life. Although he appeared rejoiced to return to the scenes of his early youth, it was evident, when he walked up to his friends dressed in a bright-chequered turban and a gay dagger, that the simple islander was changed by seeing the world, and that considerable self-esteem and pride had found their way into his heart.

The western point of Hullaniyah is called by the Arabs "Ras Shatt," by the islanders "Erekhi er Frahunt." The eastern point is called "Ras Sair."

The high bluff called Erekh Er-rahib, is in lat. 17° 32′ 43″ N., long. 56° 7′ 17″ E., allowing Bombay flag-staff to be in 72° 54′ 26″. The variation in 1835 by upwards of a hundred observations was 2° 45′ westerly.

	h.	m.
High water, full and change.....	8	20
Rise and fall.....	6 feet 6 inches	

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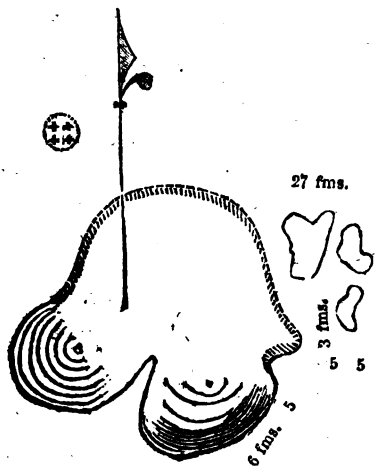
On the north side the ebb sets to the eastward.
do. south do. do. westward.
The flood sets *vice versa.*

GHUBBET ER RAHIB, or the large bay forming the N. E. side of Hullaniyah, is 3¾ miles from point to point, and 1½ miles deep. Its N. W. point is the highest part of the island, forming a bluff as before mentioned. Its S. E. point is Ras Sair. Shelter might be found in it from south easterly, southerly and south westerly winds, and a vessel might obtain fresh water by anchoring in ten or twelve fathoms, about 800 yards off shore with the extremes of the bay from N. 35° W. to S. 65° E. *true*—abreast of a small nook with a sandy beach, which may be known by a small peak that forms its eastern side. This nook is situated one mile to the westward of the east end of the long sandy beach in the centre of the bay. The well is at a distance of 400 yards in the centre of the valley turning to the westward, and is the best built well on the island.

Besides the goats before mentioned, some wild cats were seen, as also whip snakes, scorpions and centipedes.

KIRZAWET, OR RODONDO.—The smallest island of the Curia Muria group, being a mere rock, forming in a double peak, with a low point extending to the eastward. The base of this island is formed of four rocks, all closely grouped, together, composed of red granite. The highest peak is elevated 230 feet above the level of the sea, and bears from the majestic bluff of Hullaniyah, true N. 55° 20′ E., distant 6¼ nautical miles. The only dangers off it are two rocks, one situated about 300 yards to the westward of it, and the other to the N. W., 100 or 200 yards off, with a channel having from eight to sixteen fathoms water in it,



RODONDO.

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In all other bearings the island is safe to approach, having twenty fathoms within 500 yards of it. The island may be seen twenty-five miles off on a clear day, from an elevation of thirteen feet.

The channel between the island of Hullaniyah and Sodah is near 4½ nautical miles broad, but the safe channel is on the Sodah side, owing to the western point of Hullaniyah having several sunken rocks off it.

The extreme western sunken rock bears N. 86½ E. true from the high peak of Sodah, and is distant from the low point of Hullaniyah 3,660 yards, thereby reducing the channel to 5,190 yards. The sunken rocks alluded to are dry in some parts at low water spring tides, at other times in a breeze there is a break on them. They are distinct from each other, having ten to twelve fathoms water between them; but I should not recommend any vessel to attempt to run through them unless compelled, as the tides are strong, and the breakers on the rock the only guide. The only advice that I should consider necessary, either for night or day is to keep on the Sodah side of the channel, which is rocky all over, with over-falls of 3, 6 and 10 fathoms at a cast; but in no part between Sodah and the western sunken rock are there less than 7 fathoms, unless very close to either. In mid-channel there are 12 and 13 fathoms. The ebb sets through the channel to the northward, but it is much influenced by the sunken rocks.

SODAH ISLAND is the second largest and second Western-most of the Curia Muria group. Its highest peak is 1310 feet above the level of the sea, composed entirely of granite, stratified like Hullaniyah. Its extreme length is three miles, and its breadth nearly two miles. Its shape is an oblong, concave in the centre of its longest side, and its outline is an irregular slope from the high peak to the extremes, which from all views are low. It has a bay on the south side about 1500 yards deep, with good anchorage, decreasing from 10 fathoms as you approach the centre of the bay. The entrance is half a mile wide, and the bay is exposed only to winds from W. S. W. to S.

This island has many small projecting points, off which reefs extend from 100 to 300 yards, affording cover for boats. It is barren in the extreme, the only tree being the tamarisk. Here and there a few wild flowers, similar to those on Hullaniyah are scattered, and a scanty supply of grass and moss was found near the summit of the peak. It was inhabited about twenty years since, and the re-

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mains of the rude dwellings are still visible on the south side, near a well, which on our arrival was dry, but which, on being cleared out, afforded a quick supply of brackish water. The last dwellers on this desolate spot were two women,—of these one died, and the other remained "sole monarch of all she surveyed," after the decease of her companion (with whom she confessed to have repeatedly quarrelled), until taken off by a charitable Arab navigator, and conveyed to Hullaniyah, where she was living in 1836, telling many strange tales.

The soundings immediately round the island are as follows:—

Between the East and Northern points 20 to 30 fathoms, close in; from the North to the West point 20 to 30 fathoms, a mile off. On its South side 60 to 130 fathoms, three-quarters of a mile distant, and off the S. W. side 40 fathoms at a mile distant.

Off the S. E. side, between the island and Hullaniyah, the bank extends to the southward, but from 33 fathoms deepens suddenly.

At the East end of Sodah there is a sunken rock 1100 yards off shore. The channel between the island and the rock being safe. To the Westward of the rock three-quarters of a mile, a vessel will have from 25 to 30 fathoms, deepening further off.

Latitude of the High Peak.....	17°	29′	37″	N.
Longitude, allowing Bombay Flag Staff to be 72° 54′ 26″ }	55°	56′	25′	E.

HASIKI, the western island of the Curia Muria group, is 1⅔ miles long by ¾ broad, composed of granite, without a vestige of vegetation, or the appearance of ever having been tenanted by man. It was covered with thousands of birds of the gannet species, the excrement from which gave the island a white appearance. It is rocky all round, with two nooks on the eastern side. The most elevated part of the island is 500 feet above the sea, and is situated in lat. 17° 27′ 16″ N., long. 55° 40′ 49″ E.—Hasiki, like Sodah, has a sunken rock off its west side, with a channel of 16 fathoms between. The rock is about 150 yards long, and is visible from the beach with the slightest swell. There is no other danger off this island.

The channel between Hasiki and Sodah is safe, with the exception of the sunken rock off the west side of Sodah, previously mentioned. In a line drawn from the north side of Sodah to the north side of Hasiki, you

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have soundings from 35 to 40 fathoms: to the south of that line, you suddenly deepen off the bank.

The longitudes here given are deduced from the chronometric measurements in 1834, 5 and 6, with eight and five chronometers to a fixed point, and from them again by trigonometrical measurements, assuming Bombay Light-house to be in 72° 54′ 26″ E.

From Ras Karwau to Ras Saukirah the land is about 600 feet above the sea, precipitous to the water's edge, and composed of tabular limestone. Between these points there are three slightly projecting bluffs, between which the coast is slightly concave. The soundings along this line of coast are regular, a vessel finding 27 fathoms 300 yards off shore; but after passing Saukirah, the bank of uneven soundings called Rejjat Jezzar commences. From Ras Saukirah, which is elevated 622 feet above the sea, the bluff cliff takes a sudden turn to the north, leaving from thence a barren sandy beach as far as Ras Khashaim. Off Saukirah the soundings are shoaler off-shore than in-shore, varying from 25 to 33 fathoms.

To a vessel making Ras Saukirah from the N.E. it will appear a perfect bluff, slightly concave in the centre of its perpendicular; and to the N. N. Eastward of it there will rise a barn-shaped hill, which at first appears separated, but on a nearer approach will be found to be situated on the summit of the adjacent table land. The whole line of coast, with the sun shining on it, has the appearance of clay cliffs. The table land runs more easterly under the barn, and gradually approaches the sea-shore near Kirzawet, when it is again lost in the northern distance, leaving merely a sandy shore thinly sprinkled with mangrove bushes, until it joins the table cliff of Ras Khashaim.

Rajjat Jezzar, a rocky bank of overfalls of considerable extent, commencing immediately N. E. of Saukirah, and extending along the coast for twenty miles, and off-shore twelve or fifteen miles. In some parts twelve fathoms extend fourteen miles off-shore, and twenty-six fathoms at a distance of eighteen miles. In other parts five and six fathoms are found eight and ten miles off-shore, whilst close in the bank is nearly dry at low water two miles from the beach. This bank is much dreaded by the Jenabi fishermen, as the rocky bottom destroys their coir cables. There is also a very heavy ground swell at times, and the natives feel doubtful if dangers exist or not. I found none under six fathoms; but during November I had frequently great difficulty in

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keeping my station, with sometimes two anchors and 160 fathoms of chain cable.

The miserable tract of coast between Saukirah and Khaishaim gave me much trouble to survey, as during the N. E. monsoon I experienced at all times a very heavy swell, the vessel rolling her scuppers under with a whole cable on end, and topgallant mast on deck. Two or three times, indeed, she carried away all deck and bitt stoppers, straightened hook stoppers, and took out the bowers to the clinch. Notwithstanding the weather, the vessel's tender and boats, through the perseverance of my officers, accomplished this part of the survey, with about 5,000 miles of cross-soundings, in less than two months, without a single accident, or even sickness to those thus exposed,—wet through for seven and ten hours a day.

This desert line of coast is scantily inhabited by a few miserable fishermen of the Jenabi tribe, who from their mode of life may class with the Ichthyophagy. They fish on inflated skins, and it is surprising to see how well and safely they push off through a heavy surf that no boat could live in; and from my experience on this coast, I can with confidence state that they are seldom without such a surf as would make the landing in a ship's boat a hazardous experiment. They catch immense numbers of sharks; and whilst fishing, they would, to an observer, seem to have a charmed life, as the sharks never appear to catch their exposed limbs. They dry the fins and tail, which they carry to Jezirah, whence they are exported to Muscat by passing vessels. Poor wretches! their fate appeared a hard one. I pitied them, and made them a present of some rice and cloths, which put them in ecstasies.

Ras Khashaim is a dark, bluff, slightly projecting cliff, but certainly not sufficiently prominent to deserve the appellation of a headland, and bearing from Ras Jezirah (Cape Isolette.)

The cliffs from Khashaim, similarly formed to Ras Karwau, run in an E. N. Easterly direction nearly three miles, and then turn northerly, forming a concavity in the coast, with a sandy beach called Bander Jezirah. The cliffs are steep and inaccessible, and the soundings very bold having three and four fathoms within a few yards.

Bander Jezirah, a small bay with a sandy beach situated immediately to the westward of Ras Jezirah, or Cape Isolette, and between the

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latter and the cliffs of Ras Khashaim. In the bay the soundings are principally mud and sand, and a vessel may anchor in any part of it. Boats from the northward frequently anchor here to procure sharks' fins. If, however, a vessel is caught with a strong S. S. W. wind, which is not unfrequent during the N. E. monsoon, she should change her position round to the northward of the point.*

CAPE ISOLETTE, or Ras Jezirah—the former European name has been given to it, I imagine, from its forming as an island, when making it from seaward, whilst in fact the point is formed by three capes, viz; Ras Markaz, Ras Jezirah, and Ras Khashaim, making one prominent cape marked on the old charts "Isolette." Ras Markaz, which is a high bluff table land with precipitous cliffs, rose twice at thirty-three miles distance, and Ras Jezirah at twenty-six miles.

When first seen, Ras Jezirah presents the appearance of small hillocks, but on a near approach a small circular hill will be observed on the summit of the cape, resembling a rude natural pillar. This, however, is not distinguishable until long after the High Peak (in some views forming a saddle) is in sight from the deck.

This cape is essentially of limestone formation, disposed in horizontal strata, of which the lowest is of a more compact structure, and to a certain extent decomposed by the action of the salt water, which renders its surface hard. The upper stratum approaches more to chalk, having imbedded in it small shells and pebbles, whilst at the extreme high part of the peak or cape, the hill is of uniform construction, partaking of the character of a trap formation (green stone.)

From Cape Isolette a low point runs out to the N. Eastward four and a half miles, from the extremity of which the coast forms a concavity for a short way, and turns northward to Ras Markaz.

The coast from Jezirah to Ras Ruus has never been surveyed, and I have never run along it. The water is shoal, and the bottom very uneven from Ras Markaz to Ghubbet Hashish (the bay and channel between Moseirah and the main), which is reported by the natives to be unsafe, though hundreds of small craft from forty to fifty tons pass

* Geographical site on the extreme eastern side of the sandy beach of Jezirah Bay 1,800 yards E. N. E. of the natural pillar, named Tagrad Abbak, is in lat. 18° 58′ 28″ N., long. 57° 51′ 07″ E.

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through it. Navigators passing along the coast from Isolette to the northward should be very careful, as I always experienced a strong indraught or current towards the channel, generally of two or three miles per hour, compelling me to steer two points higher than the direct course.

Whilst coasting along Moseirah I made its length thirty-eight and a half miles; its north end, Ras Jei, in lat. 20° 43′ 30″ N., long. 58° 57′ E.; and its south end, Ras Bir Resas, in lat. 20° 8′ N., long. 58° 38′ E. Boats were numerous, and one village was perceptible; but I did not land, my orders being to commence from Isolette. The soundings on the east side of Moseirah appeared very deep and without dangers; but to the northward they apparently extended a considerable distance off shore. I had forty fathoms twenty miles from the coast, in latitude 21° 15′ N.

The island is of moderate elevation, the highest peak being about 600 feet high, as far as I could judge. Its outline is uneven, with numerous rocky points and sandy bays surrounding it; parts of the island are cultivated, and its population (of the Jenabi tribe) tolerably numerous. When I was surveying at Ras Jezirah, it was governed by two sheikhs, apparently independent of each other, but nominally tributary to His Highness the Imaum of Muscat. They possess many boats, and I fear are much given to plunder when they meet a weaker party than themselves.

The Arabian coast, from Moseirah to Ras Ruus, is moderately elevated near the sea, with slighly projecting rocky points. Inland, the mountains are high. The soundings along the coast are bold.

Ras Ruus is a slightly projecting rocky cape, bold to approach, with an anchorage on its south-western side. From this cape the land takes a more easterly turn, running nearly N. E. and S. W.; and about five miles N. E. of the cape is a bluff point, under which similar shelter is found, with the extreme point bearing N. E. in six fathoms, about 600 yards off shore. The latitude of this cape is 22° 4′ by observation, and on exactly the same meridian is the low sandy point of Ras el Hadd.

From Ras el Khabbah the line of the coast runs in a N. ¼ Easterly direction until it reaches Ras Akanis, or Aknis, being very bold, and forming in small bluff points, with sandy bays intervening. Its aspect is sterile in the extreme, but flocks of goats and sheep may be seen grazing. The soundings are deep close in shore.

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RAS AKANIS, or Aknisi, or the eastern Point of Arabia, bearing from the low sandy point of Ras el Hadd nearly S. S. E., 5 miles is a bluff rocky point under which boats find tolerable shelter during northerly winds in six fathoms sand and rocks, with the point bearing N. E. This cape is in latitude 22° 18′ 45″ N., long. 60° 0′ 40″ E., with a well of water west of it, inland from the sandy beach.

RAS EL HADD, the N. E. point of Arabia, is a low sandy point in lat. 22° 23′ 30″ N., and long. 60° 0′ 0″ East—allowing Bombay Light House to be 72° 54′ 26″ East—having a spit running off it nearly 300 yards. From this point the land suddenly turns in a W. N. W. direction towards Khor Jeramah. When off Ras el Hadd a fort with a village and some trees will be seen near the pitch of the cape, called by the natives Gharkah, and W. S. W. from Ras el Hadd about 10 miles, and N. W. from Ras el Khabbah (from which the annexed outline view is taken,) is Gibel Saffan, a very good mark for knowing Ras el Hadd.)

Gibul Saffan.

From the low sandy cape in a N. W. by W. direction, rocky cliffs and points extend, until you open Hajarah Bay, which is 3 miles from the cape. The points at the entrance are rocky, but with deep water in the channel, and anchorage ground in from 10 to 20 fathoms outside. The upper part of the bay, which almost joins the village of Gharkah, is shallow.

From Hajarah Bay the coast continues in a north-westerly direction, as far as the entrance to the fine inlet of Khor Jeramah, at the entrance of which a vessel may anchor in 8 or 9 fathoms; or proceed at once up to the creek carrying 6 and 7 fathoms, but she must keep on the left hand side, as a shoal with 2 or 3 fathoms on it exists on the right hand side of the channel, about a quarter of a mile from the entrance.

This creek is 4 miles deep, but narrow at the commencement for a mile, and until you open out an island, on each side of which there is a clear channel, the western one having 3, 4 and 5 fathoms, and that to the eastward 6 and 7. From this island the creek opens out to 2 miles

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in width, and becomes shallow at the upper part, on the south side, the shore of which is low marshy ground, covered with wood.

The entrance to Khor Jeramah is in lat. 22° 28′ 10″ N., long. 59° 53′ 30″ E. Full and change 7 hours, rise and fall of tide 9 feet.

SUR CREEK is the next on the coast, the entrance to which is in lat. 22° 35′ 20″ N., long. 59° 35′ 0″ E. It has shallow water 10 and 12 feet off the entrance, and a bar across it with only 2 and 3 feet water on it at low tide, deepening to 15 feet further up the channel. There is a small village on the left side of the entrance, and a large one further up the creek on the right hand, with the fort and village of Sur about 3¼ miles from the entrance. High water at full change 8 hours rise, and fall nearly 10 feet.

Having thus far turned the point of Ras el Hadd, I will proceed to offer some remarks; first on the Winds and Weather that may be expected at all seasons on the coast; and secondly, on the Currents.

I.—*On the Winds and Weather within the Gulf of Aden.*

Within the Gulf of Aden—that is, between the meridian of the Cape Guardafui and Bab el Mandeb—during the months of January, February and March, easterly and east-north-easterly breezes may be expected, increasing from Aden to the Straits. The thermometer ranges from 68° to 80° Fahrenheit, with pleasant and generally clear weather. Rain may sometimes fall, but not in any great quantity. These months are the principal for trade, in which boats from 50 to 300 tons are engaged.

In April and May the winds are generally light, varying from E. N. E. to S. E. and S., with clear weather. I have, however, seen thick, hazy weather; and in-shore I have experienced land breezes from four to eight A. M., with on one occasion in May, a strong westerly breeze.

In April the weather becomes warmer, and the mercury rises to 80° and 86°, and in May, owing to the light winds and calms, it is frequently intolerably hot, the thermometer ranging from 84° to 95°. I have seen it rain at Aden three days in succession in April, but during other years scarcely a shower has fallen. Heavy dews at night may always be expected.

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June is a very unsettled month—the wind uncertain, and the weather at times clear, but generally hazy. During the morning it is either calm, or else very light airs, which sometimes increase towards noon, and blow pretty fresh from the southward, occasioning a long swell on the Arabian coast. Towards the middle of the month, between Burnt Island and the Straits, westerly winds may be expected, blowing through the Straits with violence, and sometimes enabling a vessel bound to India to reach the monsoon. During these strong westerly winds the thermometer will fall below 80° in the morning, and not exceeding 85° during the day; and the change of temperature that a person coming down the Red Sea feels, is surprising, as immediately after passing the Straits the mercury falls ten degrees.

July and August may be classed together as similar. A few clear days occur, but generally speaking it is hazy; and I have experienced a thick impenetrable fog for two or three days together.

Taking the average of six years' experience, out of sixty-two days it blows hard from the westward and south-westward, thirty-eight days and during the remainder there are moderate and fresh southerly breezes during the day, and light airs at night, with a long swell setting on the Arabian coast. The climate, owing to the strong westerly winds and rain within the Red Sea, is not so insufferably hot as during May and June; indeed, the mercury falls in-shore to 68° and 70° sometimes in the morning, and does not rise above 82° or 84° during the day; but the general average is between 77° or 87° Fahrenheit. This relates to a vessel at sea, but within the town of Aden the thermometer varies from 84° at sunrise to 104° with the sun past the meridian, during the westerly winds; while at the west point forming the entrance to its splendid harbour, the thermometer varies from 74° to 88° at the same period. This difference is caused by the wind crossing the high mountain of Shemshan before it reaches the town of Aden; whereas at the west point it meets with no obstruction. During six years I never recollect seeing more than a few passing showers of rain without the Straits; but in general the dew at night is heavy. During these months a vessel may experience, in the evening, after the southerly wind subsides, a severe land squall, with thick dust, which rising as a cloud gives good time for the seaman to prepare for its reception.

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September and October.—In September the westerly wind ceases, and land sea-breezes prevail during both these months, with calm sultry nights, rendering the weather oppressively warm, the thermometer ranging from 84° to 96° Fahrenheit. Towards the latter end of October the nights become cooler, and at sunrise sometimes the thermometer will stand as low as 78° and 79°. I have seen a few slight showers in October, November and December. From the commencement of November to the end of the year the weather gradually becomes cooler; and the N. E. monsoon, which reaches Makallah about the 5th of November, gradually increases, blowing fresh at the springs; and strange to say, it is a fact, that for four years I have noticed that from the 27th of December to the 3rd January the weather is generally threatening, and blowing a gale with heavy rain on the Arabian coast. During these months the winds are principally from E. to E. N. E., with pleasant weather, &c.,—temperature ranging between 76° and 84°.

The wind which is generally termed in India the S. W. monsoon, blows out of the Red Sea in a southerly direction, varying with the line of mountains on the Arabian coast. Outside the Straits it resumes a westerly direction, but it seldom reaches far beyond Aden. At Ras Aseir, on the coast of Africa (commonly known as Guardafui), it blows with great violence along the coast about N. N. E., and thence across the Gulf of Aden to Ras Rehmat, a cape to the south and west of Makallah. On this line a vessel generally enters the monsoon when proceeding from the Red Sea to the eastward.

From Ras Rehmat to the Straits the westerly and southerly winds prevail, and a long southerly swell is experienced. The monsoon, however, forms a decided line from Ras Aseir to Ras Rehmat, and thence to the eastward as far as Ras el Radd, blowing with more or less violence according to the month, and age of the moon.

II.—*On the Winds and Weather likely to be experienced within the Gulf of Aden along the line of the Arabian Coast to Ras el Hadd.*

December, January, February, and 15 days of March;—during these months the N. E. monsoon blows along the line of coast, changing

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according to the inflection of the land, whilst at a distance from the land it blows from N. E. to E. by S., with clear pleasant weather, free from squalls and rain. This description will answer for every part of the coast above alluded to, with the exception of that part between Ras Seger and Ras Karwau, and more especially with the exception of the extensive bay of Curia Muria; which is so entirely different from other parts of the coast, that I have judged it best to give a synopsis of the weather during the tedious trying time that I was employed in making a trigonometrical survey of it. The sudden changes of the winds, and the great violence with which they blew, rendered the position of the surveying vessel I commanded frequently dangerous; and she was only extricated by the activity of the officers and crew, and her good supply of ground tackle (four chains of 125 fathoms each, and six anchors on board.)

It is also necessary to observe, that these changes give no warning, owing to which, I was compelled, for the safety of the vessel, to secure her thirty miles from the islands—while I surveyed them in my boats; and it was not an uncommon occurrence for boats to be manned and ready, when from a clear serene sky a light arched cloud would appear over the table cliffs surrounding the bay, and in five minutes (just time to run the boats up) we could not see ten yards from us, and it blew a perfect gale from the northward. These winds are termed by the Arabs Balat, or Belat, and are much dreaded; but what surprised me more than these land winds were the frequent and heavy gales from S. S. W. during February and March, blowing six days together. In one of these, towards the close of the survey of the island, I was surprised when sounding round the bay on a dead lee shore, having parted two bowers. My night orders were to run the stay-sails up, if she parted, and steer for the sandy beach on the N. W. side of the bay, the only way to save the crew, as the vessel would never work to windward in blowing weather.

I now beg to subjoin a Synopsis of the Weather experienced by me whilst surveying Curia Muria bay.

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Synopsis of the Weather experienced off the Curia Muria Islands in 1835 *and* 1836.

December.	Winds.	January.	Winds.	February.	Winds.
14	Light E. N. E. to E. S. E.	7 8 9 10 11	Light land and sea breezes.	12 13 14	Fresh gale S. to S. E. by S.
15	Light S. E.	12 to 17	Moderate from N. E. to E. S. E.	15	Calm, light airs, clear sky.
16	Light S. E. and South.	18	A furious Belat from N. to W. N. W.	16 17 18	Hard gale N. to N. W.
17	Hard Gale from N. to N. W.	19 to 23	Ditto. Ditto.	19	S. S. E. to S. W. Fresh.
18	Ditto Ditto.	24	Moderate gale P. M., light airs.	20	Ditto. Ditto.
19	Fresh W. N. W.	25 26 27	Blowing a gale from N. to W. N. W.	21	Moderate gale at S. S. W.
Note.	*Reliance* Whaler wrecked during the	28	Moderate N. Easterly.	22	Northerly moderate gale.
	night; crew saved by me.	29	N. E. to N., moderate.	23	Ditto. Ditto.
20	Fresh Gale N. W. to North.	30	N. N. E, light.	24	Gale at S. S. W. Squalls and rain.
21 22	Moderate A. M. Light P. M. Northerly.	31	N. E., moderate.	25	Hard Gale S. S. W. } Vessel parted two Bowers.
23	Light E. N. E.	February.		26	Ditto. Ditto. }
24	Ditto.	1	Easterly and moderate.	27	Moderate S. S. W.
25 26 27	Light airs and calms.	2	E. N. E. and light.	28	S. by E. to S. S. W. moderating.
28	A. M. North, P. M. S. E.	3 4 5	Fresh gale N. to N. W.	29	Moderate.
29 30	Light E. N. E. and S. Easterly.	6	Moderate E. N., Easterly breezes.	March.	
31	Calm.	7	N. E. to E. S. E., moderate.		
January.		8	Fresh gale N. to N. W.	1	S. E. by E. to South, moderate.
1	Hard Gale N. to N. W.	9	Ditto. Ditto.	2	E. S. E. to S. S. E.
2 3 4 5	Ditto. Ditto.	10	Moderate N. N. E. to E. N. E.	3	Fresh Southerly.
6	Fresh A. M., P. M. light airs.	11	Fresh Southerly gale, to S. E. by S.	4	Light airs from N. N. E. to E.

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These northerly gales do not extend far to the southward, but appear confined to the limits above mentioned: when clear of Curia Muria Bay and past Ras Nuus, they blow along the line of coast (being influenced by the high range of the Subhan mountains) towards Morbaat, in which anchorage the water is smooth, from the wind blowing off-shore. When the deep valley of Dhofar is opened, it again blows off-shore with great violence.

The southerly breezes appear also confined to that part of the Arab coast, as to the southward they are seldom felt, and the S. W. monsoon does not reach Sokotrah before the 1st or 10th of May. For three years successively it reached Sokotrah on the 4th of May, with heavy rain on the 6th and 9th; so that navigators coming from the Gulf towards the Red Sea, must not imagine the S. S. W. winds they may fall in with in February or March to be the S. W. monsoon, though this has been the case, and a fast-sailing vessel to my knowledge bore up for Bombay.

From the 15th March till April the winds are light and variable along the whole line of coast, and the weather warm. Land and sea-breezes enable the crowd of boats from Sur and Moseirah to run back with their cargoes of shark-fins, the produce of some months toil, to the southward. The sky is in general cloudless, atmosphere light and pure, with heavy night dews.

May is a doubtful month; for if the monsoon is early, it may blow hard from the S. W. At times, however, moderate weather is experienced.

During June, July, and August the South West monsoon is in its full strength, and blowing at times very hard along the line of coast, in July particularly. In the early part of June large boats run from the Red Sea to the Persian Gulf; and this voyage, which is accomplished after the first blast of the monsoon, is termed "tadhbir." They also leave at the latter end of August, and run up during the "degmani," or after the strength of the monsoon is over.

September. During this month the winds are moderate from the westward and southward, and the weather warm. In October light uncertain breezes and calms are common; land and sea breezes at some times, when in-shore, and at night-cloudy with passing showers of rain. November: I have found the N. E. monsoon generally reach the coast of Arabia between the 10th and 20th of this month, after which

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the winds blow along the coast, that is from the northward and eastward, but prior to the monsoon the weather is the same as in October, with rain also.

In concluding this subject, I would observe that the experience of years along this coast, has taught me that implicit confidence cannot be placed on the regularity of the seasons, as I have frequently during the same month in different years experienced exactly opposite winds. In March 1835 I was 20 days from the Curia Muria islands to Makallah, with southerly and westerly winds, and contrary currents; and in March 1836, I was only three days, having the N. E. monsoon with me. Further I have observed, that at all seasons and in all parts of the coast of Arabia, particularly when the land is low, the wind is influenced more or less by the sun's position, and according to the rarity of the atmosphere changes towards the sea; and even in strong breezes the same influence obtains to a certain degree.

III.—*Remarks on the Currents on the Somali and Arabian Coasts.*

To the subject of Currents in the Gulf of Aden, and on the Arabian coasts, I have devoted considerable time and attention, with but little satisfaction to myself, and I fear to no purpose. I have, however, delineated, on an outline chart, the currents I experienced at different seasons and years, which may place the navigator on his guard, and show him the necessity of nocturnal as well as diurnal observations.

My endeavours to ascertain the cause of such currents, and to lay down principles to guide others, entirely failed; nor am I at this moment satisfied as to how the currents are set in motion—whether by internal impulse, by difference of the component parts of the sea water, by inequality of evaporation, or by pressure from prevailing winds. I am, however, more inclined to believe in the latter, and that it is the pressure of water caused by the prevailing monsoons, that causes the strong in-shore current. But this theory will decide merely for the coast current; whereas, at sea, I have experienced the current running in circles or bands of 60 miles in extent; and not unfrequently have I borne up, and set a topmast studding-sail, with a foul wind, in order to escape a contrary current; and when by observation, I have found the vessel in another stream, or out of the former current, I have hauled to

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the wind again, and by such means have beaten fast sailers, who were working up in-shore.

It is an established fact, that the water is higher in the northern parts of the Red Sea, during December, January, February and March, from the force of the strong southerly winds that blow up that sea; and that in July, August and September it is several feet lower, from the force of the strong N. N. westerly winds down the sea. This fact is proved by the "Durable" shoal, which, though situated in the middle of the sea, is at one time sufficiently dry to have a tent pitched upon it, and at another season is covered with water. The same difference of elevation may be also observed in Jiddah, on the coral reefs there.

On the Arabian coast from Ras Isolette to the Straits, in-shore, during the strength of the N. E. monsoon the current runs with the wind. In March and April (and sometimes so early as February) it changes, and flows towards Isolette during the S. W. monsoon. In April I have measured the current with the patent log, and the vessel at anchor, and found it setting up the coast 1 and 2 miles per hour, and off the Palinurus shoal, much more. During May, June and July I have also measured the current between Aden and the Straits, at different stations on the Arabian side, when at anchor in from 6 to 10 fathoms, and found it 2 and 2½ miles E. N. E., varying in rapidity with the strength of the wind. During the N. E. monsoon it sets with equal velocity into the Red Sea. This should materially tend to prove the effect of pressure; but strange to say, though the wind is the same on the Somali coast, or the south side of the Gulf of Aden, during the N. E. monsoon, the currents are sometimes running in a precisely contrary direction, without any apparent cause. This led me at one time to imagine that the narrow entrance to the large body of water within the Red Sea (which is moreover reduced by the islands called the "Brothers") from a kind of barrier or point of deflection; that the current from the Mozambique Channel rushing past Ras Aseir at three or four miles per hour, bifurcates at that point, one branch going to the northward, and the other diminished in rapidity by the absence of the strong southerly wind, sweeps along to the westward, as far as the Straits, where, being influenced by the current out of the Red Sea, it turns up to the eastward, gradually recovering its former velocity as it again enters the monsoon. This current on the Somali coast in the

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N. E. monsoon is very uncertain. The Natives say, that when the current on the Arabian coast is running one way, on the Somali coast it is generally opposite. In the N. E. monsoon vessels have met strong northerly currents, when to the northward, or rather when Ras Aseir was open, which as soon as the Cape was shut in changed to the westward again. Currents frequently set to the eastward between Zeyla and Berbera during the N. E. monsoon.

Whilst the two coasts forming the Gulf of Aden have their currents, the centre part of the sea has streams playing in every direction, except during strong breezes, when pressure undoubtedly influences the whole. Thus, for instance, a vessel in July crossing over for Burnt Island with a strong westerly breeze will find the current change from W. to N. W. N., N. E. and E. N. E., increasing in strength as she approaches the Arabian coast, and probably preventing her from fetching within 20 miles of Aden under a press of canvass. In the N. E. monsoon of course a contrary rule obtains, and a vessel leaving Berberah for Aden will work up some 15 or 20 miles east of Siyarah before she ventures to stretch across to the Arabian coast.

A vessel running up her northing, on the east of the African coast, during the S. W. monsoon, and wishing to stand for Aden or the Red Sea, should be very careful for the last two or three degrees, as N. N. E. and N. E. currents will be experienced. I have found a current of 3 or 4 miles an hour, which, as you round the Cape sweeps more eastward towards Sokotrah. In a sailing vessel, therefore, the Cape should be rounded close, otherwise she may lose her passage, which I have known a fast sailing vessel to have done.

To the northward of Tahl Far'un and the Brothers, from June to September, I have always experienced a strong N. E. or E. N. E. current, which renders it difficult to fetch the anchorages on the northern side of Sokotrah. In July, when in the latitude of the north side of Sokotrah, and only 1½ degrees west of Ras Aseir, I have had light airs and calms, with a current 58 miles due south; whilst in previous years, in almost the same position, I have found a northerly current, which gradually drew to the eastward as the vessel stood to the S. E.

On the north side of Sokotrah, during March and April, I invariably found a strong westerly current, so much so that I have known a fast 10-

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gun brig take 20 days to make Tamaridah from Kolonsir, and she then succeeded only by standing over to the Arabian coast, and working up along it to the eastward before she stood across; and I was obliged to anchor my vessel at the first place where I could obtain anchorage-ground, and proceed in one of my boats to Tamaridah during March, owing to the light airs and strong currents.

The true cause therefore of these currents appears to me to be principally the pressure occasioned by the prevailing monsoons, increasing and decreasing in the same ratio as the winds, and influenced in some degree by the moon's age, and consequent time of tides, which are by no means regular.

IV.—*On the Variation of the Compass.*

There can be but little doubt that the westerly variation is decreasing along the coast of Arabia, as previous navigators, touching on the parts of the coast that I have attempted to describe, have made the variation considerably more to the W. than I found it to be, and I would not doubt the correctness of their observations. The splendid instruments that I have observed with, and the number of observations, enable me with confidence to assert that the variation was ascertained with great correctness during my survey of the coast.

The variation from Isolette to the Straits varied from 3° to 5° 45′ W. increasing towards the Straits. In some places I found the needle influenced by the metallic composition of the rocks, among which I may enumerate Ba-l Haff, Makatin, Jebel Hadid at Aden, and Bab-el-Mandeb. At the three former places it was trivial; but on the peak of Minhali, or Ras Bab-el Mandeb and Perim Islands, or Meyun, in a much greater degree, which I will explain by the following observations, taken at fixed stations.

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Observers.	No. of Observation.	At what place.	Results.
Lt. Sanders & Myself..	72 Observations, mornings and evenings.	On sand by Jetty or Perim.	5° 32′ Wesly.
Myself.....	8 Observations, mornings.	At North end of Fundamental base on sand.....	5 42 Wesly.
Lieut. Sanders.....	6 Observations, mornings.	At 2nd Corroborative base on main to the Eastward of Minhali.....	5 40 Wesly.
Myself.....	28 Observations, morning and evening.	Ras Sheik Said. a low black point N. of Fisher's Rock on sand.....	5 43 Wesly.
Lieut. Sanders.....	8 Observations, mornings.	Same place.....	5 30 Wesly.
Mr. Cruttenden.....	8 Observations, mornings.	Same place.....	5 47 Wesly.
	130 Observations.		5 42 20 W.

Westerly Variation observed at Perim Pyramid, by myself, 11 Observations. 7° 58′ W.

On High Brother, in the bay, 500 fathoms N. 6 W. of Peak.

True bearing of Minhali Pyramid, by 14 observations with sextant and false horizon..... N. 14 9½ E. / 5 42

which observation N. 19 51½ E. Magnetic, is about the difference of Station, and the Magnetic bearings at the Peak of High Brother, at the station it agreed, proving no attraction at the Brother.

THEODOLITE BEARINGS AT DIFFERENT STATIONS.

Place.	Observer.	Object.	Magnetic Bearings.
At Pyramid or Perim Island.	Myself.....	Minhali Peak..... / High Brother Peak	N. 68° 24′ E. / S. 7° 36′ 30″ W.
High Brother...	Lt. Sanders.	Pyramid on Perim. / Minhali Peak.....	N. 5 21½ E. / N. 19 31 E.
Minhali Peak Pyramid.. ...	Lt. Sanders.	High Brother..... / Perim Pyramid....	S. 6 2 W. / S. 52 34 W.
N. 68° 24½′ E. / S. 52 34 W. / 15 50 diff.	High Peak of men Ali Perim Pyramid of cross bearings.	N. 5° 21′ 30″ E / S. 7 36 30 W. / 2 15 00	High Brother Perim Pyramid, Difference agreeably with difference of Azimuth.

At what place.	By what Means.	Result.
On board, at anchor under the Cape, on the Forecastle.	Magnetic bearing by a Prismatic, and true to an object, Head N. N. W.	5 20 West.
On board, at anchor, at the Topmast Head.	By Prismatic compass and true bearings, I took it aloft, to see if the metal about the decks influenced the needle, which in some places it did considerably.	5 30 West.

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The result of 72 observations on the sandy beach at Perim differing from 11 observations I took on the summit, convinced me that some local attraction existed, and in consequence I tried various ways to ascertain the truth. I took 28 observations on the point of Ras Sheikh Ali, on the sand, clear of all metallic substances. These observations agreeing with those taken on the sandy beach at Perim, and with others taken at the second corroborative base to the eastward of Minhali, led me to believe that the attraction arose from the composition of the stones of which the Pyramid was built, the specific gravity of which was 2·688. I then observed magnetic and true bearings on Minhali Peak, as also on the Peak of the High Brother, and of Ras Sijan, as well as observations on board, and the result is shown in the table, proving local attraction on the summit of Perim at the Pyramid, and in a still greater degree at the Peak of Minhali, the specific gravity of which was 2·578. A specimen of the latter, weighing seventeen ounces, broken off from the summit, attracted the needle *when close*, 10, 12 and 13 degrees, according to the position in which it was held. The vertical angle of the needle was very much changed, and the rock apparently affected its dip or depression more when the needle was caused, by the influence of attraction, to diverge east or west of the true north.

The variation made by the squadron under Sir Home Popham, in 1800, at the extreme of the Straits of Bab-el-Mandeb was 9° 20′ W., which gives a diminution of westerly variation of 6′ 14″ annually, rather great; I admit, but the proof of diminution is that the westerly variation formerly found to exist at Perim is exactly what late observations have decided as the variation at Suez in the prevent day.

V.—*Remarks on the Navigation of the Gulf of Aden, and along the South and East Coasts of Arabia, with Advice as to the best way of working though the Straits of Bab-el-Mandeb against strong S. E. and N. W. winds.*

In the first place, I would observe that the entrance into the Red Sea has generally been divided by seamen into the small and large Straits. I will, however, describe them as the North (small), South and Centre (large) Straits, as there are decidedly three channels.

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The north or small strait is between the rocky island of Perim (Meyun,) and Ras Bab-el-Mandeb, on which rises the Peak of Minhali, but more correctly I should say Pilot Rock, or Jezirat Hasan, which channel is about 2,800 yards broad between the nearest points, increasing in breadth at the entrance east or west. In this Strait there is no danger; but a spit of broken ground runs out a short way from the northward side of Perim, and another from Pilot Rock to the low black Point N. W. of it. The discoloration of the water distinctly points out the position of both. The soundings are bold and irregular in the centre and over on the Perim side, but on the north side to the N. W. of Pilot Rock, regular, with sandy bottom. The soundings in the North Straits are from eight, twelve and sixteen fathoms. The tides are very irregular, both in period and strength; sometimes, *in the centre*, I have experienced very little ebb; whilst at others, particularly at night on the full and change, the tide runs at the rate of four knots per hour, creating a strong ripple when opposed to the wind, and rendering a dull heavy vessel almost unmanageable. It is high water at twelve hours. Rise and fall of tide seven feet, with anchoring ground in every part.

The Large (or Centre) Straits are formed by the channel between the islands called the Brothers, or Jezirat-es-Sab'ah, and the south side of Perim is from nine to ten miles broad, and perfectly safe. The soundings towards the Brothers are deep, having on the true meridian between the High Brothers and the west point of Perim harbour, 178 and 185 fathoms, three miles distant from the former, and the same to the eastward, with deep water close to them, but towards the West Brother and Gibul Sijan it is shoaler, without danger. On the Perim side of the channel a bank of soundings projects to the distance of three miles off the island, having 40 or 60 fathoms on its outer edge, and gradually shoaling to 20 fathoms close to the island. This bank is connected with that running along the Arabian coast, and from which you deepen suddenly into 150 and 180 fathoms. The greatest depth I found in the large or centre Straits was 185 fathoms. The Southern Straits are formed between Gibul Sijan on the Abyssinian coast and the Brothers. The narrowest part of the channel is three and half miles broad, and lies between Sijan and the West Brother.

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The soundings are pretty regular, having 8 to 12 and 15 fathoms all over, with good anchorage-ground. The only danger exists on the Abyssinian shore, which has a rocky reef along it in some places, extending one and quarter mile from the beach, on which you suddenly shoal from 5 to 6 fathoms.

The currents and tides are strong and irregular, setting with the line of coast. High water 11h. 40m. full and change, the flood tide rising suddenly one or two feet. Ten fathoms is a good line to avoid the shore reef.

Of course, with a fair wind in passing through the Straits, the nearest course to the destined port would be chosen by the navigator. The northerly or small Straits would therefore be generally preferred, and any remarks for the same are unnecessary, as a mid-channel course will take a vessel clear of all dangers. These Straits having, even of late years, been frequently mistaken, I deemed it advisable (to prevent any recurrence of the same) to etch on the trigonometrical survey of them a correct outline of Bab-el-Mandeb Peak and Perim, when seen in making the Straits from the eastward. From this sketch it will be perceived that the vessel first will rise a small peak at a distance of 25 to 30 miles, (dependent of course on the state of the atmosphere.) On nearing it, others gradually rise until they become united. At the distance of 15 to 20 miles Perim will be seen from the deck, to the *southward* of the Peak *first* seen. Perim, on rising appears low, gradually sloping from the centre, which is 250 feet high, to its extremes. How mistakes have occurred, and do so frequently happen, I cannot conceive. It is, however, only necessary to remind the stranger, that the outline of Perim is even and unbroken, gradually sloping; whereas the Cape has many irregularities with the Peak of Minhali, or, as it is sometimes called, Quoin Hill, which is elevated above the sea nearly a thousand feet, and cannot be mistaken.

If a vessel has to work through with either a south-easterly or north-westerly wind, I consider the small Straits preferable, as there is anchoring-ground all over it, and good anchorage on either side of the Cape in the event of accident or failure, besides—the stream is more certain. With strong breezes in the N. E. monsoon, I have been detained two or three days, and I have known vessels bear up six or seven days successively after trying both the large and small Straits, I invariably got through

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best at night, owing to the tides running stronger. With a strong north-wester, I have been equally detained, owing to the uncertainty of the tides, which are influenced by the strength of the wind. Indeed, after a fresh north-wester I have known the flood in the channel run for 16 hours, and *vice versâ*, after a south-easter, the water at the same time ebbing and flowing on the beach with regularity. My experience teaches me that the certainty of currents or tides in the fair-way depends entirely on the preceding weather, and a navigator may make his calculations accordingly.

I have known vessels endeavour to beat through the large Straits, owing to there being more sea room for night work, and though carrying a press of canvass, even to the springing of a lower and topsail-yard, splitting topsails, &c., they have not succeeded. One instance in particular came under my knowledge, of a fast sailing man-of-war being compelled to bear up, after ineffectually striving to beat into the Red Sea for ten days. The cause of this was, that sufficient care was not taken to ascertain in which channel she gained most. In the large Straits the currents are conflicting and unsteady, generally running in circles, and rendering it almost impossible for a dull sailer to get through.

Vessels lying at Mocha during the strong southerly gales which blow with violence in December, January, and February, should never attempt to work down to the Straits, as, however well-manned and equipped she might be, a fast vessel would tear herself to pieces, and probably carry away some spars. She should wait for a lull, and then work tides day and night, anchoring close in-shore, with the flood. When she reaches the North Straits, she should anchor close under the lee of Pilot Rock, so as to have the whole night ebb to work through with ; to accomplish which, activity, seamanship, and a good eye are the only requisites. I only once failed after weathering the rock at 2 A. M., owing to my splitting a double-reefed maintop-sail, fore-sail, and main top-gallant-sail in a strong gust. A vessel entering the Straits from the eastward with a north-wester, has only to work night or day off the Arabian coast, in soundings. At night the soundings are an excellent guide, and working between 15 and 35 fathoms, a vessel cannot miss the small Straits, the edge of the bank off-shore being very precipitous. It is only to be regretted that all commanders wishing to enter the Red Sea do not provide themselves with the trigonometrical survey of the entrance to

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the Red Sea, executed by myself and officers, on a large scales, for the benefit of navigation, and sent home by me for publication, when draughtsman to the Indian Navy.

I consider the North Straits, therefore, decidedly the best to work in, and the Arabian side the most preferable. As an additional proof of this, I may mention that in July 1818, two sister ships-of-war, the *Mercury* and *Auora*, mounting each 14 guns, left Aden for Mocha. They had very heavy weather on the passage, and parted company, the fastest sailer trying the Abyssinian shore, whilst the other, keeping over to the Arabian coast, worked up without difficulty, and beat her consort seven days in a distance of 140 miles.

Vessels working along the Arabian shore between Aden and the Straits, during the months of June, July, and August, will frequently experience thick hazy weather, with great change of climate. I have known the temperature vary in 24 hours from 89° to 64° Fahrenheit, with slight showers of rain—which change, however, but slightly affected the barometer. If the wind is blowing from W. N. W. to N. W., frequent gusts may be looked for, especially in-shore, and when the weather has been quite moderate, I have known southerly winds set in suddenly, and very fresh. The breezes generally increase from sun-set to midnight, when they fall light, with a heavy long southerly swell. During the months of June, July and August, a vessel in the Gulf of Aden should have good sails bent, and take care to be on the bank of soundings in proper time, so that she can anchor in from 10 to 20 fathoms, should it fall calm, or the current be against her. On the Abyssinian coast, during these months, the necessity of having good sails and rigging is equally great, as the gusts off-shore at times are very violent, with (strange to say) a swell frequently setting along-shore from the westward, which causes a very heavy surf on the beach.

With proper precaution there is little danger. A good look-out, the lead, and nocturnal observations are requisite, and should be carefully attended to. The most dangerous part of the coast is the reefs off Zeila, and the bank of broken ground running off-shore for two, three and four miles, between Ras Arah or Cape St. Anthony and Jebel Jan. On this there are several shoal patches, with one and a half to two and four fathoms on them at low water, and several vessels have been wrecked upon them. A vessel navigating between these two head-

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lands of Arah and Jan, should not come under 20 fathoms at night, and 15 in the day-time, as the water shoals so suddenly that a vessel with good head-way on her, after getting a coast of 15 fathoms at night, would hardly have time to pass the lead along again, before she would be in the broken ground. In the day-time the edge of the reef is perceptible.

Between Isolette and the entrance to the Red Sea there is little danger, and all that does exist has been pointed out in my Memoir of this Survey, Parts I. and II. It remains for me, therefore, only to give my opinion as to the best manner of proceeding from the Red Sea to the eastward.

During December, January, February and March, trading vessels arrive from the eastward carrying a light or strong monsoon, as the case may be; and very few, if any, except square-rigged vessels, attempt the passage to India, it being in general so long and tedious. I have always experienced the greatest advantage in paying great attention to the currents, which during December, January and February usually set along the coast in a W. S. W. direction. If I found the currents in-shore strong against me, I always stood out to sea for 60 or 80 miles, availing myself of all changes of wind. If the winds were light I preferred being in-shore, so as to avail myself of tides and land winds, but that only when the current was not strong to the W. S. W. I have known one vessel, which was fortunate enough to find a S. S. W. breeze off the Curia Muria Islands, make the passage to Bombay in these months in 21 days, whilst other ships were 90. In March and April I found I could do better in-shore, as the currents are favorable, and the winds light and variable. In May I should recommend a ship to work in-shore as far as Fartak, and thence take the open sea if bound to India, or keep well off-shore if wishing to make the Persian Gulf.

September and October are tedious, trying months for making a passage either to or from the Red Sea, the winds being so very light and uncertain. I have tried passages both in and off-shore, but I found it the best plan to work according to the currents, and if I found land and sea-breezes, to avail myself of them, and anchor if requisite.

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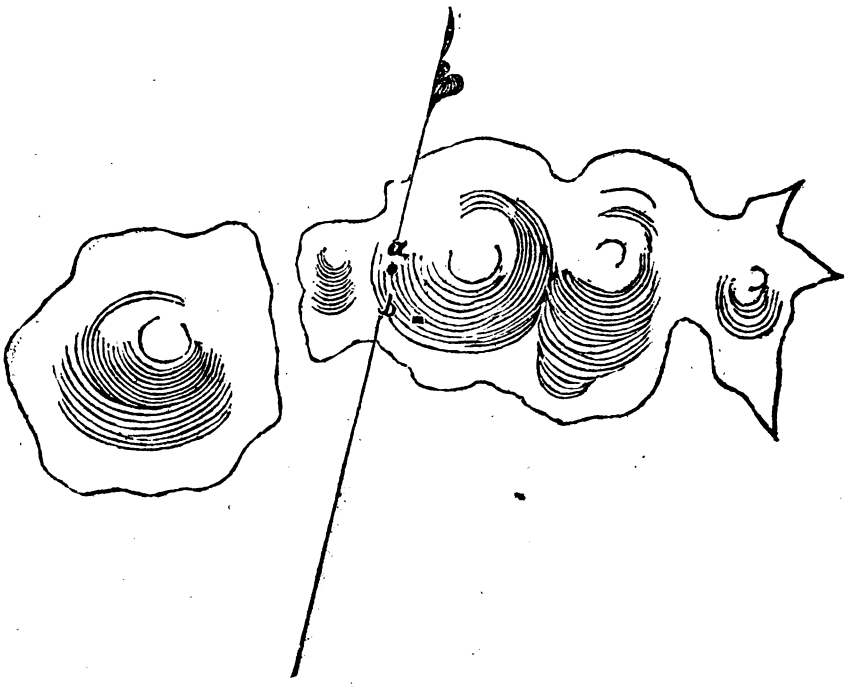
APPENDIX TO PART II.

Owing to the Bengal steamer's having nearly run on Tahl Farun, or Salt's Rocks, in the night, from its position being incorrectly laid down, I determined to fix their true geographical position, and left Kolonsir after sights for this purpose, and the next day observed on Salt's Rocks, which I found formed thus :—



Having in my run discovered that the rocks are considerably more to the westward than laid down, and that Abdul Kuri, which was distinctly visible, must also be to the westward, and thereby reduce the passage between Cape Guardafui and the latter, an important matter to our steamers and other vessels; and after fixing the position

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of the rock, I observed for variation, and took true bearings to Abdul Kuri, the result of which at once proves what I have above asserted—that Abdul Kuri is closer to the N. E. point of Africa than hitherto laid down.

The following are the results on Tahl Farun :—

OBSERVERS.

Lieut. (now Commander) Sanders, with Captain Haines' sextant by Troughton.
Meridional altitude..... 122° 26′ 33″ lat., 12° 25′ 46′. 3.

Captain S. B. Haines, with the Honourable Company's sextant by Dolland, the best sextant and strongest power in the ship.
Meridional altitude..... 122° 24′ 35″. lat., 12° 25′ 50″ $\frac{25}{100}$

Lieutenant Rennie, with the Honourable Company's sextant, by Gilbert.
Meridional altitude..... 122° 28′ 35″ lat., 12° 25′ 45″ N.

Longitude of Kolonsir, by trigonometric and several chronometric measurements, with six and eight chronometers, allowing Bombay Lighthouse to be 72° 54′ 26″ E.

Is Kolonsir 53° 34′ 23″ E. Light Station.

	°	′	″
Honourable Company's chronometers, 298 M'Cabe.	1	21	55
„ 162 „	1	21	48
„ Baird „	1	22	09
„ Baird „	1	21	58
Captain Haines' chronometer by Frodshaw.....	1	21	22
„ Young.....	1	21	48
Mean.	1	21	50 E. of Tahl Farun.

Kolonsir longitude.....	53°	34′	23″ E.
	1	21	50
Longitude of Salt Rocks.....	52	12	33
Variation.....	2	50	0

From Light Station on Tahl Farun or Salt's Rocks, the following bearing and angles were taken :—

	True.
Eastern bluff of Abdul Kuri.....	S. 35° 22′ E.
Western extreme of island ditto.....	∠ 57 12
True bearing W. extreme of ditto.....	S. 21 50 W.
Haycock hill right of eastern bluff.....	42 25
True bearing of Haycock hill.....	S. 7 03 W.
East bluff right E. extreme of Abdul Kuri.	∠ 8 20
True bearing of east extreme of ditto.....	S. 43 42 E.

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ABDUL KURI is a long and moderately elevated island, in latitude between 12° 9′ and 12° 12′ north, which will by the true bearing from the fixed position on Tahl Farun, give the longtitude of the east and west ends, thus—

Tahl Farun.....	52°	12′	33″
S. 21° 50′ W. 16° longitude..	0	6	20
Longitude of the west end of Abdul Kuri...	52	6	13
S. 43° 22′ W. 20° longitude.	0	15	39
Longitude of the east end of Abdul Kuri,....	52	28	3

By which calculation, Cape Guardafui (allowed as proved) by the survey of the "*Palinurus*" in longitude 51° 20′ 45″ E., and latitude 11° 50′ 45″ N., will bear from the west end of Abdul Kuri S. 66½ W., only forty-eight miles.

SALT'S ROCKS extend in a N. E. and S. W. direction about 2,000 yards, and in the breadth do not exceed 200 or 300 yards; they are divided to the westward of the centre by a narrow and shallow rocky channel.

The eastern rock is the largest, and has one large peak elevated about 400 feet above the sea, and two or three small ones; the western rock has one peak of equal height, and one smaller one, it is composed of granite, and from all points of view has a white appearance, from the multitudes of birds (gannets) that frequent them. Not a vestige of vegetation of any kind was found on them, and their only occupants were birds, vermin and lizards.

TAHL FARUN ROCKS appear in different views in two, three, four, and five peaks, and in daytime can be seen seven or eight leagues off; but at night, though clear, I could not with a good night-glass discover them at eight miles.

Time did not permit me to make a minute survey of these islands, but while on Tahl Farun I dispatched my quarter cutters in different directions to sound. To the northward the bank did not extend far from the rocks, but to the north-westward had 33 fathoms two miles off.

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To the W. S. W.	- - -	20 fathoms	2	miles	off.
To the S. S. E	- - -	15 „	3	„	„
To the S. E.	- - - -	11 „	2¼	„	„
To the E. S. E.	- - - -	9 „	1	„	„

And within these limits overfalls of two, three, four, and six fathoms at a cast rocky bottom. I do not know if any danger exists between Abdul Kuri and Tahl Farun, but caution is requisite.

When eight miles off the rocks, at night, I was suddenly disturbed by Lieutenant Jardine, who was officer of the watch, calling to Quarter-Master to jump into the chain and take a cast of the lead. No bottom was found, so I directed the deep-sea-lead to be hove; but finding no bottom at eighty fathoms, and the ship apparently on the bank with discoloured water, I examined the sea-water with a microscope, and found it full of small animalcula, resembling in shape limpets, of a white colour, which of course at once accounted for the white appearance of the water in a clear star-light night; this appearance was similar to muddy water in five or six fathoms.

Having experienced a similar luminous appearance on the coast frequently, and tried the same experiments, I merely mention it, that navigators may not give to the world a supposed danger, until the experiment of sounding has been tried.

(Signed). S. B. HAINES, Captain I. N.

(True Copy) A. MALET, Chief Secretary.

Aden, May 4th, 1844.

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HOSHUNGABAD METEOROLOGICAL OBSERVATIONS, JANUARY, 1849.

Days of the Month.	Days of the Week.	Barometer corrected to 32° Fahrenheit. A. M. 9 to 10.	Barometer P. M. 3·30 to 4·30.	Barometer Mean.	Register Therm. in open verandah, facing North. Minimum.	Maximum.	Daily Range.	Aspect of Sky. Morning.	Noon.	Evening.	Wind. Morning.	Noon.	Evening.	Mason's and Daniell's Hygrometers. Time.	Dry Bulb.	Wet Bulb.	Difference.	Time.	Amb. Air.	Dew Point.	Difference.	Rain Gauges. On Ground. Inch.	Dec.	Elevated 13 Feet. Inch.	Dec.	Evaporation. Inches.	Standard Ther. taken daily in open house. At 2 P. M.	Black Bulb Register Therm. in Sun. Maximum.
		In.	In.	In.																								
1	Mon.	29.097	28·920	29·008	54·3	75·0	20·7	Clear.	Clear.	Clear.	S W	E by S	E	Noon.	73·5	56·8	16·7	Noon.	73·5	50·0	23·5	...	...	...	...	·312	74·8	91·0
2	Tues.	·107	·917	·012	50·1	76·9	25·8	Clear.	Clear.	Lgt. clds.	N E	N E	E	...	74·4	57·9	16·5	...	74·5	50·5	24·0	...	...	...	...	·296	76·1	95·5
3	Wed.	·051	·920	28·985	56·2	79·9	23·7	Clear.	Clear.	Lgt. clds.	E N E	N E	W by S	...	76·3	61·0	15·3	...	76·5	52·0	24·5	...	...	...	...	·365	77·3	93·0
4	Thur.	·085	·913	·989	55·6	78·2	21·4	Clear.	Clear.	Clear.	S W	E N E	N E	...	75·5	58·0	17·5	...	75·5	50·5	25·0	...	...	...	...	·368	76·8	93·5
5	Frid.	·136	·949	29·042	55·0	74·6	19·6	Clear.	Lgt. clds.	Clear.	N E	E	E	...	71·8	57·8	14·0	...	71·5	50·0	21·5	...	...	...	...	·299	74·0	89·5
6	Sat.	·119	·952	·035	54·1	72·6	18·5	Clear.	Clear.	Clear.	N E	N E	E	...	70·3	56·7	13·6	...	70·5	50·0	20·5	...	...	...	...	·271	70·5	89·0
7	Sun.	·107	·995	·651	55·3	72·7	17·4	Hazy.	Clear.	Lgt. clds.	E	N W	W	...	70·9	56·8	14·1	...	71·0	50·0	21·0	...	...	...	...	·284	70·8	89·0
8	Mon.	·095	·899	28·997	57·8	77·1	19·3	Lgt. clds.	Hazy.	Lgt. clds.	E	E N E	E	...	72·2	60·7	11·5	...	72·0	53·0	19·0	...	...	...	...	·301	72·4	95·5
9	Tues.	·094	29·004	29·049	60·5	69·6	9·1	Cloudy.	Overcast.	Cloudy.	S W	N N E	N E	...	69·8	61·9	8·[illegible]	...	70·0	57·5	12·5	...	...	...	...	·174	69·8	88·0
10	Wed.	·110	28·946	·028	57·0	73·1	16·1	Lgt. clds.	Clear.	Lgt. clds.	E	E by N	N E	...	70·6	62·8	7·8	...	70·5	57·5	13·0	...	...	...	...	·178	71·2	87·5
11	Thur.	·098	·902	·000	56·8	75·0	18·2	Lgt. clds.	Overcast.	Clear.	E N E	N E	E	...	74·1	64·0	10·[illegible]	...	74·5	58·0	16.5	...	...	...	...	·215	72·0	92·0
12	Frid.	·083	·904	28·983	56·1	72·1	16·0	Lgt. clds.	Clear.	Clear.	E	E	Var.	...	69·7	61·2	8·[illegible]	...	70·0	59·0	11·0	...	·360	...	·335	·137	71·3	89·0
13	Sat.	·052	·893	·972	55·2	72·3	17·1	Clear.	Hazy.	Clear.	E N E	E	W S W	...	70·5	60·3	10·[illegible]	...	70·5	59·5	11·0	...	...	...	...	·127	70·4	91·0
14	Sun.	28·906	·787	·846	55·8	76·0	10·2	Lgt. clds.	Lgt. clds.	Cloudy.	E	S E	S S E	...	73·3	62·2	11·1	...	73·5	61·0	12·5	...	...	...	...	·153	75·2	93·0
15	Mon.	·898	·751	·824	63·1	69·7	6·6	Cloudy.	Cloudy.	Cloudy.	W	S W	W	...	68·8	60·0	8·8	...	69·0	60·5	8·5	...	·786	...	·769	·137	68·5	...
16	Tues.	·989	·813	·901	57·1	67·3	10·2	Lgt. clds.	Lgt. clds.	Lgt. clds.	W	N W	W	...	66·8	60·0	6·8	...	67·0	58·0	9·0	...	·349	...	·335	·106	67·0	83·5
17	Wed.	29·012	·876	·944	51·3	65·4	14·1	Lgt. clds.	Clear.	Cloudy.	N W	E	W	...	63·1	53·7	9·4	...	63·0	52·5	10·5	...	...	...	...	·129	64·2	84·0
18	Thur.	28·965	·841	·904	55·2	66·8	11·6	Lgt. clds.	Cloudy.	Fair.	N by W	N E	E	...	66·0	58·5	7·[illegible]	...	66·0	56·0	10·0	...	...	...	...	·116	64·6	87·0
19	Frid.	29·092	·932	29·012	54·0	70·0	16·0	Lgt. clds.	Clear.	Clear.	E	N E	W	...	68·0	61·0	7·0	...	68·0	57·5	10·5	...	...	...	...	·120	67·9	89·0
20	Sat.	·070	·901	28·985	54·3	71·7	17·4	Fair.	Clear.	Lgt. clds.	E	N N E	E	...	70·3	60·8	9·5	...	70·5	57·0	13·5	...	...	...	...	·159	68·0	90·0
21	Sun.	·052	·885	·968	56·1	75·1	19·0	Clear.	Clear.	Lgt. clds.	E	W	N W	...	73·5	60·3	13·2	...	73·5	56·0	17·5	...	...	...	...	·234	75·0	92·5
22	Mon.	·032	·876	·954	56·8	76·3	19·5	Lgt. clds.	Clear.	Lgt. clds.	E	S S W	E	...	75·3	66·6	8·7	...	75·5	59·5	16·0	...	...	...	...	·225	75·0	93·0
23	Tues.	·033	·893	·963	60·6	77·4	16·8	Lgt. clds.	Lgt. clds.	Lgt. clds.	E	E S E	W S W	...	77·0	68·1	8·9	...	77·0	59·5	17·5	...	...	...	...	·177	75·4	94·0
24	Wed.	·028	·905	·966	56·6	75·2	18·6	Lgt. clds.	Clear.	Clear.	E N E	N E	E	...	73·2	65·2	8·0	...	73·5	55·5	18·0	...	...	...	...	·266	74·8	93·0
25	Thur.	·037	·907	·972	56·8	75·9	19·1	Clear.	Lgt. clds.	Clear.	E	E S E	S E	...	73·4	63·1	10·3	...	73·5	54·0	19·5	...	...	...	...	·277	75·0	91·0
26	Frid.	·058	·902	·980	55·5	79·6	24·1	Clear.	Clear.	Clear.	E S E	S by E	S E	...	77·0	65·0	12·0	...	77·0	55·5	21·5	...	...	...	...	·301	77·6	92·5
27	Sat.	·072	·898	·985	57·8	77·5	19·7	Lgt. clds.	Clear.	Clear.	E	E N E	E	...	74·1	61·9	12·2	...	74·0	53·0	21·0	...	...	...	...	·322	76·1	92·0
28	Sun	·056	·843	·949	59·0	77·6	18·6	Clear.	Clear.	Clear.	E N E	E N E	E by N	...	76·4	63·3	13·1	...	76·5	53·5	23·0	...	...	...	...	·344	76·5	93·5
29	Mon.	·066	·895	·980	58·8	80·9	22·1	Clear.	Clear.	Clear.	N E	E	N E	...	76·4	63·5	12·9	...	76·5	53·5	23·0	...	...	...	...	·372	76·9	97·5
30	Tues.	·076	·900	·988	60·1	82·6	22·5	Lgt. clds.	Clear.	Clear.	E	W by S	E	...	78·4	64·5	13·9	...	78·5	54·0	24·5	...	...	...	...	·404	77·2	100·0
31	Wed.	·027	·859	·943	57·9	81·2	23·3	Clear.	Clear	Clear.	E	E	N E	...	77·8	62·7	14·1	...	78·0	53·5	24·5	...	...	...	...	·379	76·5	100·5

SUMMARY.

Mean of Barometer, reduced to 32° Fahrenhiet.. .. .. Inches 28·975

			°	′
Mean of Maximum.....	Temperature..	Per register Instruments in open Verandah facing North.....	74	7
Mean of Minimum.....			56	5
Mean of Standard Thermometer...			72	8
Mean of Daily Range.. ...			17	8
Mean Temperature of Month..			65	6
Highest Maximum occurred on 30th..			82	6
Lowest Minimum occurred on 2nd..			50	1
Mean temperature in Sun, per Black Bulb Instrument..			91	5
Mean of Evaporation..			Inches.	·243
Mean of Dew Point at Noon..			55°	0′
Prevailing Winds..			N. E. and E. N. E.	
Fall of Rain..			Inches	1·495
Difference given by upper and lower Pluviometers, the former being elevated 13 feet..				·056

(*Note.*—The Pluviometers are of the form recommend by the Royal Society, and are changed after each registry to equalize any errors of construction.)

OBSERVATIONS.

JANUARY, 1849, was a pleasant, bracing, cold month, free from atmospheric disturbances of any note. The sky was generally clear, especially at nights, and heavy dew was observed on 21 mornings. Towards the middle of the month rain fell to the amount of Inch. 1·495, which was an unusual occurrence for this month, none having fallen in 1848, and only to the extent of ·220 in 1847. On the morning of the 11th a fog covered the station.

The Barometer, in its monthly mean, was slightly higher than in the previous month (December).

There is an approach to uniformity in the mean temperature of this with the corresponding months of 1847 and 1848.

Mean temperature of January 1847, 68°2; 1848, 67°0; 1849, 65°6; giving an extreme difference of 2·6. And the diminished temperature of the last January may, I think, be justly ascribed to the rain which then descended, as already stated.

The mean temperature of a spring 75 feet below the surface, was 79·3, from six observations.

The station was very healthy; no casualties having taken palce in the Regiment, Police or Prisoners.

The other data of interest will be found embodied in the "Summary" of this and of the following months.

PHASES OF THE MOON, JANUARY, 1849.

	D.	H.	M.	
1st Quarter..	2	0	49	A.
Full Moon..	9	4	1	M.
Last Quarter..	16	0	5	A.
New Moon..	24	3	14	A.
1st Quarter..	31	9	53	A.

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HOSHUNGABAD METEOROLOGICAL OBSERVATIONS, FEBRUARY, 1849.

Days of the Month.	Days of the Week.	Barometer corrected to 32° Fahrenheit. A. M. 9 to 10.	Barometer P. M. 3·30 to 4·30.	Barometer Mean.	Register Therm. in open veranda, facing North. Minimum.	Maximum.	Daily Range.	Aspect of Sky. Morning.	Noon.	Evening.	Wind. Morning.	Noon.	Evening.	Mason's and Daniell's Hygrometers. Time.	Dry Bulb.	Wet Bulb.	Difference.	Time.	Amb. Air.	Dew Point.	Difference.	Rain Gauges. On Ground. Inches.	Dec.	Elevated 13 Feet. Inches.	Dec.	Evaporation. Inches.	Standard Therm. taken daily in open house. At 2 P. M.	Black Bulb Register Therm. in Sun. Maximum.
		In.	In.	In.																								
1	Thur.	29·050	28·857	28·953	63·2	84·0	20·8	Lgt. clds.	Lgt. clds.	Lgt. clds.	E	W S W	W	Noon.	78·5	65·3	13·2	Noon.	78·5	54·5	24·0	...	...	...	...	·444	80·7	100·5
2	Frid.	·007	·838	·922	67·2	80·9	13·7	Cloudy.	Cloudy.	Cloudy.	S W	S W	S W	...	78·2	66·4	11·8	...	78·0	56·0	22·0	...	...	...	...	·426	80·1	100·0
3	Sat.	·024	·862	·943	67·8	81·0	13·2	Lgt. clds	Clear.	Clear.	E by N	N E	W	...	76·4	62·7	13·7	...	76·5	54·5	22·0	...	...	...	...	·441	78·4	98·5
4	Sun.	·033	·832	·932	62·1	79·1	17·0	Lgt. clds.	Clear.	Cloudy.	W	N E	N E	...	77·1	62·3	14·8	...	77·0	53·0	24·0	...	...	...	...	·393	76·7	97·0
5	Mon.	·042	·894	·968	61·0	76·9	15·9	Clear.	Clear.	Cloudy.	N E	N E	W	...	76·2	65·8	10·4	...	76·5	53·0	23·5	...	...	...	...	·365	75·2	94·5
6	Tues.	·138	·969	29·053	57·0	75·3	18·3	Clear.	Clear.	Clear.	N E	N N E	E	...	74·3	62·6	11·7	...	74·5	50·5	24·0	...	...	...	...	·335	75·0	92·0
7	Wed.	·140	29·002	·071	53·5	75·1	21·6	Clear.	Clear.	Clear.	N E	N E	N E	...	73·5	56·3	17·2	...	73·5	50·0	23·5	...	...	...	...	·308	74·1	93·5
8	Thur.	·122	28·907	·014	52·6	78·0	25·4	Clear.	Clear.	Clear.	E	E by N	N E	...	76·0	59·1	16·9	...	76·0	50·0	26·0	...	...	...	...	·342	77·1	97·0
9	Frid.	·039	·903	28·971	51·2	81·6	30·4	Clear.	Clear.	Clear.	S W	S W	E	...	78·3	58·2	20·1	...	78·0	50·5	27·5	...	...	...	...	·374	79·2	98·0
10	Sat.	·048	·907	·977	56·6	81·1	24·5	Hazy.	Clear.	Clear.	S by W	S W	S W	...	79·0	57·8	21·2	...	79·0	49·0	30·0	...	...	...	...	·439	79·2	94·5
11	Sun.	·047	·871	·959	59·0	79·8	20·8	Clear.	Clear.	Clear.	S W	S W	W	...	77·2	56·9	20·3	...	77·0	49·5	27·5	...	...	...	...	·425	78·6	96·0
12	Mon.	28 967	·771	·869	56·1	83·2	27·1	Clear.	Clear.	Hazy.	E	S W	W	...	79·3	59·6	19·7	...	79·5	50·0	29·5	...	...	...	...	·446	79·4	98·0
13	Tues.	29·040	·800	·920	60·2	84·1	23·9	Clear.	Hazy.	Lgt. clds.	W	S W	W	...	82·8	60·1	22·7	...	83·0	50·5	32·5	...	...	...	...	·511	80·6	98·5
14	Wed.	28·996	·811	·957	59·5	83·5	24·0	Clear.	Hazy.	Hazy.	E by N	S W	W	...	81·4	61·8	19·6	...	81·5	50·0	31·5	...	...	...	...	·492	80·1	102·5
15	Thur.	·938	·750	·844	63·4	85·7	22·3	Clear.	Clear.	Clear.	W	W by S	W	...	81·4	63·0	18·4	...	81·5	51·5	30·0	...	...	...	...	·542	82·1	102·0
16	Frid.	·935	·806	·871	64·2	87·2	23·0	Clear.	Clear.	Clear.	E by N	N E	E	...	81·7	64·3	17·4	...	82·0	50·5	31·5	...	...	...	...	·584	81·8	105·5
17	Sat.	29.058	·880	·969	63·0	83·5	20·5	Clear.	Hazy.	Clear.	E	S W	W	...	81·4	61·5	19·9	...	81·5	50·5	31·0	...	...	...	...	·529	81·2	100·5
18	Sun.	28·931	·699	·815	58·6	90·8	32·2	Hazy.	Clear.	Clear.	S W	W	W by S	...	82.6	60·2	22·4	...	82·5	50·0	32·5	...	...	...	...	·477	82·5	104·5
19	Mon.	·902	·612	·757	62·6	90·4	27·8	Hazy.	Clear.	Clear.	W	W	W	...	82·6	62 6	20·0	...	82·5	49·0	33·5	...	...	...	...	·625	84·7	105·0
20	Tues.	·782	·573	·677	67·0	94·8	27·8	Hazy.	Hazy.	Clear.	S W	W	W	...	90·3	64·1	26·2	...	90·0	50·5	39·5	...	...	...	...	·791	84·6	106·0
21	Wed.	·830	·697	·763	68·2	90·8	22·6	Lgt. haze.	Clear.	Clear.	S W	W	S W	...	84 4	62·3	22·1	...	84·5	49·0	35·5	...	...	...	...	·711	83·1	107·5
22	Thur.	·827	·633	·730	67·0	90·7	23·7	Clear.	Hazy.	Hazy.	S S W	S W	S W	...	85·8	62·5	23·3	...	85·5	48·5	37·0	...	...	...	...	·714	83·0	105·0
23	Frid.	·793	·657	·725	67·8	89·4	21·6	Clear.	Clear.	Clear.	W	W	W	...	85·6	62·1	23·5	...	85 5	49·0	36·5	...	...	...	...	·702	81·8	102·0
24	Sat.	·881	·826	·854	66·3	84·3	18·0	Hazy.	Hazy.	Clear.	W	S	S W	...	83·8	66·0	17·8	...	84·0	49·0	35·0	...	...	...	...	·615	80·0	101·5
25	Sun.	·989	·852	·920	61·2	83·4	22·2	Clear.	Hazy.	Clear.	S W	W	W	...	78·4	58·6	19·8	...	78·5	48·5	30·0	...	...	...	...	·507	78·2	101·0
26	Mon.	29·021	·887	·954	60·0	82·2	22·2	Hazy.	Clear.	Clear.	S E	W	S W	...	80·3	59·4	20·9	...	80·5	50·0	30·5	...	...	...	...	·481	79·5	100·0
27	Tues.	·085	916	29·000	59·8	85·4	25·6	Clear.	Clear.	Hazy.	W	E by N	N E	...	81·5	58·1	23·4	...	81·5	50·0	31·5	...	...	...	...	·503	81·6	101·0
28	Wed.	·105	·925	·015	61·3	89·6	28·3	Clear.	Hazy.	Clear.	W	W	S W	...	86·8	62·6	24·2	...	87 0	51·0	36·0	...	...	...	...	·623	84·8	106·0

SUMMARY.

Mean of Barometer, reduced to 32° Fahrenheit... ... ... Inches 28 907

			°	′
Mean of Maximum,.....	Temperature....	Per Register Instruments in open Verandah facing North.....	83	9
Mean of Minimum,.....			61	3
Mean of Standard Thermometer...			80	1
Mean of Daily Range...			22	6
Mean Temperature of the Month...			72	6
Highest Maximum occurred on 20th...			94	8
Lowest Minimum occurred on 9th...			51	2
Mean Temperature in Sun per Black Bulb Instrument.....			100	3
Mean of Evaporation...			Inches	·505
Mean of Dew Point at Noon...			50°	6′
Prevailing Winds...			W. and W. S. W.	
Fall of Rain...			Inches	0

OBSERVATIONS.

FEBRUARY.—The two first days of this month were unsettled, a trivial shower occurring on the 1st at 11 A. M., and on the 2nd at 3 P. M., thunder and lightning, and slight sprinkling of rain; not sufficient, however, in either instance for registration. No perturbation was noticed from this date to the 20th, which was sultry, and half a gale blew the greater part of the day. The sky was more uninterruptedly clear during the earlier days of this than the last month, and dew formed nights and mornings till about the 10th abundantly. The first twelve days were pleasant and cheerful, and the mornings and evenings delightfully cool, but the latter half of the month was close, hazy and dry, and very different from what has hitherto been experienced here at this period of the year.

The Barometer was subject to a slight descent in the mean.

No rain was registered this month: in February 1848, only ·009, and in 1847, ·350.

The accordance in the mean temperatures of these months for three years is somewhat greater than in the January months.

Mean temperature of February, 1847, 72°0; 1848, 73°4; 1849, 72°6; shewing an extreme difference of 1°4. The same spring as used last month gave a mean, from eight observations, of 80°1.

At the close of this month it was remarked that the wheat crops in the neighbourhood did not appear so vigorous as could be desired.

The sanatory condition of the station continued good, and no casualty has transpired in Regiment, Police, or Prisoners.

PHASES OF THE MOON, FEBRUARY, 1849.

	D.	H.	M.	
Full Moon...	7	4	26	A.
Last Quarter...	15	9	13	M.
New Moon...	23	6	40	M.

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HOSHUNGABAD METEOROLOGICAL OBSERVATIONS, MARCH, 1949.

Days of the Month.	Days of the Week.	Barometer corrected to 32° Fahrenheit. A. M. 9 to 10.	Barometer P. M. 3·30 to 4·30.	Barometer Mean.	Register Therm. in open veranda, facing North. Minimum.	Maximum.	Daily Range	Aspect of Sky. Morning.	Noon.	Evening.	Wind. Morning.	Noon.	Evening.	Mason's and Daniell's Hygrometers. Time.	Dry Bulb.	Wet Bulb.	Difference.	Time.	Amb. Air.	Dew Point.	Difference.	Rain Gauges. On Ground. Inches.	Dec.	Elevated 13 Feet. Inches.	Dec.	Evaporation. Inches.	Standard Therm. taken daily in open house. At 2 P. M.	Back Bulb Registered Ther. in Sun. Maximum.
		In.	In.	In.														Noon.										
1	Thur.	29·074	28·945	29·009	65·4	91·3	25·9	Clear.	Clear.	Clear.	S W	W	W S W	Noon.	89·3	64·2	25·1	...	89·5	51·5	38·0	...	...	...	...	·585	89·1	108·5
2	Frid.	·071	·927	28·999	65·7	92·1	26·4	Clear.	Clear.	Hazy.	S W	W	W	...	85·2	63·4	21·8	...	85·0	50·0	35·0	...	...	...	...	·627	89·5	109·0
3	Sat.	·094	·932	29·013	66·6	88·8	22·2	Clear.	Hazy.	Clear.	N E	E	W	...	86·8	61·4	25·4	...	87·0	49·5	37·5	...	...	...	...	·593	84·6	107·5
4	Sun.	·182	29·074	·128	65·9	89·5	23·6	Clear.	Clear.	Clear.	N E	N E	E	...	87·0	62·3	24·7	...	87·0	49·0	3·0	...	...	...	...	·599	86·5	106 5
5	Mon.	·077	28·895	28·986	68·2	90·0	21·8	Clear.	Lgt. haze.	Cloudy.	N E	N E	N E	...	89·0	62·6	26·4	...	89·0	49·5	39·5	...	...	...	...	·637	88·6	107·0
6	Tues.	·009	·784	·896	66·6	89·3	22·7	Cloudy.	Hazy.	Cloudy.	W	W	W	...	89·6	63·0	26·6	...	89·5	49·0	40·5	...	...	...	...	·606	84·8	110·5
7	Wed.	28 944	·797	·870	70·8	92·1	21·3	Lgt. clds.	Hazy.	Lgt. clds.	S W	S S W	W	...	90·1	66·8	23·3	...	90·0	50·5	39·5	...	...	...	...	·699	84·7	112·5
8	Thur.	·934	·788	·861	70·3	91·2	20·9	Clear.	Lgt. clds	Hazy.	E	E by S	W	...	90·0	66·2	23·8	...	90·0	51·5	38·5	...	...	...	...	·662	84·5	112·0
9	Frid.	·999	·79[illegible]	·898	69·5	92·4	22·9	Clear.	Clear.	Clear.	S W	S W	S W	...	86·2	63·0	23·2	...	86·5	49·5	37·0	...	...	...	...	·696	84·2	107·0
10	Sat.	29·080	·917	·998	68·5	89·4	20·9	Clear.	Clear.	Hazy.	E by N	N E	E	...	88 4	63·5	24·9	...	88·5	49·5	39·0	...	...	...	...	·621	84·0	107·5
11	Sun.	·089	·931	29·0[illegible]0	68 5	93·1	24 6	Hazy.	Clear.	Lgt. clds.	S W	E by N	E	...	90·8	66·0	24·8	...	91·0	51·0	40·0	...	...	...	...	·656	84·8	112·5
12	Mon.	·006	·831	28 968	70·0	94·0	24·0	Hazy.	Lgt. clds.	Cloudy.	E	Var.	W	...	92·0	66·0	26·0	...	92·0	52·5	39·5	...	...	...	...	·692	84·6	113·5
13	Tues.	·040	·868	·924	72·8	92·7	19·9	Clear.	Hazy.	Clear.	E by N	E	N E	...	91·6	65·3	26·3	...	91·5	51·0	40·5	...	...	...	...	·738	82·9	100·0
14	Wed.	·050	·874	·962	69·1	91·4	22·3	Lgt. clds.	Lgt. clds.	Lgt. clds.	N E	E	W	...	90·4	64 6	25·8	...	90·5	51·0	39·5	...	...	...	...	·652	84·3	108·5
15	Thur.	·040	·872	·956	69·5	93·0	23·5	Hazy.	Dull.	Lgt. clds.	N E	N E	S W	...	91·2	65·2	26·0	...	91·5	51·5	40·0	...	...	...	...	·678	84·7	111 0
16	Frid.	·078	·928	29·003	71·0	91·6	20 6	Cloudy.	Cloudy.	Cloudy.	S W	W	W	...	89·0	62·5	26·5	...	89·0	50·0	39 0	...	...	...	...	·702	84·5	111·5
17	Sat.	·060	·888	28·974	74·8	92·9	18·1	Lgt. clds.	Haze.	Lgt. clds.	N E	N E	N E	...	89·1	62·3	26·8	...	89·0	49·5	39·5	...	...	...	...	·797	83·2	109·0
18	Sun.	28·988	·834	·911	72·1	92·4	20·3	Haze.	Haze.	Lgt. clds.	N E	E	Var.	...	87·8	63·6	24·2	...	88·0	49·0	39·0	...	...	...	...	·745	84·6	110·0
19	Mon.	·876	·670	·773	71·6	93·2	21.6	Haze.	Clear.	Clear.	W	S W	S W	...	89·9	63·8	26·1	...	90·0	49·5	40·5	...	...	...	...	·746	84·3	110·5
20	Tues.	·828	·704	·766	67·2	94·6	27·4	Clear.	Clear.	Clear.	W	W	S W	...	92·4	62·3	30·1	...	92·5	49·0	43·5	...	...	...	...	·702	83·4	110·0
21	Wed.	·915	·751	·833	63·3	94·7	31·4	Clear.	Clear.	Hazy.	S W	S W	S W	...	93·0	64·1	28·9	...	93·0	50·0	43·0	...	...	...	...	·628	83·3	113·0
22	Thur.	·976	·768	·872	70·6	96·5	25 9	Lgt. haze.	Clear.	Clear.	W S W	W	S W	...	92·5	67 0	25·5	...	92·5	49·5	43·0	...	...	...	...	·786	83·9	112·0
23	Frid.	·988	·736	·862	70·1	97·3	27·2	Clear.	Clear.	Clear.	E	N E	W	...	95·0	67·8	27·2	...	95·0	51·5	43·5	...	...	...	...	·766	84·6	117 0
24	Sat.	·906	·712	·809	72·4	98·8	26 4	Lgt. clds.	Hazy.	Lgt. clds.	S W	W	S W	...	95·4	67·6	27·8	...	95·5	52·5	43·0	...	...	...	...	·825	85·1	118·0
25	Sun.	·888	·673	·780	75·0	98·8	23·8	Clear.	Clear.	Lgt. clds.	W by S	W	W	...	96·2	67·9	28·3	...	96·0	52·0	44·0	...	...	...	...	·880	84·4	117·5
26	Mon.	·922	·697	·809	76·7	99·0	22·3	Lgt. clds.	Lgt. clds.	Lgt. clds.	S W	S S W	W	...	96·8	70·2	26·6	...	96·5	52·5	44·0	...	...	...	...	·909	84·6	116·0
27	Tues.	·926	·704	·815	79·2	98·7	19 5	Clear.	Hazy.	Lgt. clds.	W	W	W	...	97·0	69·8	27·2	...	97·0	52·5	44·5	...	...	...	...	·911	85·4	117 0
28	Wed.	·883	·662	·772	74·5	99 2	24·7	Lgt. clds.	Lgt. clds.	Lgt. clds.	W	S W	W	...	98·0	67·8	30·2	...	98·0	51·5	46·5	...	...	...	...	·885	86·0	115·0
29	Thur.	·817	·655	·736	75·8	98·5	22.7	Great haze	Hazy.	Clear.	S W	S W	W	...	96·2	67 8	28·4	...	96·5	51·0	45·5	...	...	...	...	·901	86·1	117·5
30	Frid.	·847	·657	·752	76·2	98 9	22·7	Lgt. haze.	Clear.	Clear.	E	W	W	...	98 6	70·0	28·6	...	98·5	52·5	46·0	...	...	...	...	·896	85·9	120·0
31	Sat.	·9.6	·746	·831	79 6	101·3	21·7	Lgt. haze.	Haze.	Very hazy.	W	W	N W	...	98·2	73·1	25·1	...	98·5	53·0	45 5	...	...	...	...	·958	86·2	115·0

SUMMARY.

Mean of Barometer reduced to 32° Fahrenheit.. .. .. Inches			28·888
Mean of Maximum..... Temperature..	Per Register Instrument in open Verandah facing North.....		94 +
Mean of Minimum.....			70 8
Mean of Standard Thermometer..			85 +
Mean of Daily Range..			23·2
Mean Temperature of the Month..			82 5
Highest Maximum occurred on 31st..			101 3
Lowest Minimum occurred on 21st..			63 3
Mean of Temperature in Sun per Black Bulb Instrument..			111 7
Mean of Evaporation.. .. .. Inches.			·734
Mean of Dew Point at Noon..			50° 7′
Prevailing Winds..			N. E. and W. S. W.
Fall of Rain.. ... . Inches.			0

OBSERVATIONS.

MARCH.—Till the 6th the atmosphere was close, dry and hazy, and from the 2nd had been so highly charged with electricity that Cavallo's Electrometer could be speedily excited at a distance of 20 inches. The Barometric column was at the highest point yet registerd here viz. Inches 29·182 at the morning maximum of the 4th—but curved rapidly downwards to 29·009 at the same hour on the 6th. The feelings induced by this condition of the atmosphere were such as to engender a suspicion that some important change was about to ensue. At 8 P. M. of the 6th a severe storm of thunder and lightning, with a few drops of rain, occurred. After the storm, although the mean daily temperature was not decreased thereby, the mornings and evenings were pleasant; yet the last two weeks of the month, as the augmenting thermometric readings would lead one to infer, were most oppressive and disagreeable,—the more especially so, since the air, except on the 19th, 20th, and 21st, barely stirred : on the dates just mentioned we had steady stiff breezes. The three concluding days of the month were particularly hazy and oppresive, and this state of matters passed into the next month.

The agreement of the mean temperatures in these months for three years is most remarkable,—no rain having fallen therein in either year.

Mean temperature of March 1847, 82°0; 1848, 82°6 ; 1849, 82°5 : extreme difference 6.

The monthly mean of the Mercurial column has somewhat diminished.

The mean temperature of the spring, resulting from ten observations, was 79°6.

The wheat has suffered to a great degree in places of the Hoshungadad district embraced in an area of 15 or 20 miles from the station : without this range the crops do not appear to have been affected.

Fevers and Dysentery were on the increase. No deaths in any department.

PHASES OF THE MOON, MARCH 1849.

	D.	H.	M.	
First Quarter....	2	5	14	M.
Full Moon..	9	6	13	M.
Last Quarter..	17	5	49	M.
New Moon..	24	7	16	A.
First Quarter....	31	0	9	A.

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HOSHUNGABAD METEOROLOGICAL OBSERVATIONS APRIL, 1849.

Days of the Month.	Days of the Week.	Means of Two Barometers from 16th, corrected to 32° Fahrenheit.			Register Therm. in open veranda, facing North.			Aspect of Sky.			Wind.			Mason's and Daniell's Hygrometers.								Rain Gauges.				Evaporation.	Standard Therm. taken daily in close house.	Black Bulb Registered Ther. in Sun.
		A. M. 9 to 10.	P. M. 3·30 to 4·30.	Mean.	Minimum.	Maximum.	Daily range.	Morning.	Noon.	Evening.	Morning.	Noon.	Evening.	Time.	Dry Bulb.	Wet Bulb.	Difference.	Time.	Amb. Air.	Dew Point.	Difference.	On Ground. Inches.	On Ground. Dec.	Elevated 13 Feet. Inches.	Elevated 13 Feet. Dec.	Inches.	At 2 P. M.	Maximum.
		In.	In.	In.																								
1	Sun.	28·876	28·672	28·774	79·9	96·6	16·7	Den. haze.	Haze.	Den. haze.	N E	W	N W	Noon	89·7	65·5	24·2	Noon.	89·5	52·5	37·0	...	...	...	...	·732	86·2	112·5
2	Mon.	·881	·669	·775	75·8	95·9	20·1	Haze.	Lgt. haze.	Haze.	E	S W	N W	...	92·0	65·9	26·1	...	92·0	53·0	39·0	...	...	...	...	·643	87·1	113·0
3	Tues.	·926	·758	·842	72·0	99·0	27·0	Lgt. haze.	Clear.	Clear.	S W	S W	W	...	95·3	66·6	28·7	...	95·5	53·0	42·5	...	...	...	...	·813	86·5	119·5
4	Wed.	·912	·731	·821	72·1	98·6	26·5	Clear.	Clear.	Clear.	E by N	E	S W	...	96·2	67·0	29·2	...	96·0	52·0	44·0	...	...	...	...	·822	86·8	120·0
5	Thur.	·843	·641	·742	74·0	102·5	28·5	Clear.	Clear.	Clear.	N E	S W	S W	...	98·8	69·8	29·0	...	99·0	52·5	46·5	...	...	...	...	·717	87·4	121·0
6	Frid.	·879	·724	·801	77·9	101·4	23·5	Clear.	Clear.	Clear.	S W	S W	W	...	98·8	70·2	28·6	...	99·0	56·5	43·5	...	...	...	...	·913	87·3	117·0
7	Sat.	·889	·637	·763	79·0	102·9	23·9	Clear.	Clear.	Clear.	W by S	W	W	...	100·5	70·8	29·7	...	100·5	58·5	42·0	...	...	...	...	·932	86·9	119·0
8	Sun.	·907	·562	·732	79·5	104·0	25·5	Clear.	Lgt. haze.	Clear.	W	S W	S S W	...	100·2	70·5	29·7	...	100·0	58·5	42·0	...	...	...	...	·924	87·0	118·0
9	Mon.	·826	·631	·728	79·2	103·2	24·0	Haze.	Clear.	Clear.	W	S W	S W	...	99·8	71·4	28·4	...	100·0	59·0	41·0	...	...	...	...	·935	86·1	115·0
10	Tues.	·860	·745	·802	83·5	100·3	16·8	Clear.	Clear.	Lgt. haze.	S W	W S W	W	...	99·4	71·0	28·4	...	99·5	59·5	40·0	...	...	...	...	·956	86·4	113·0
11	Wed.	·866	·743	·804	78·0	103·4	25·4	Clear.	Clear.	Clear.	N W	W	S W	...	99·0	71·3	27·7	...	99·0	58·5	40·5	...	...	...	...	·924	86·6	122·0
12	Thur.	·838	·660	·749	78·0	104·3	26·3	Clear.	Clear.	Lgt. clds.	S W	S W	N W	...	100·5	68·5	32·0	...	100·5	59·5	41·5	...	...	...	...	·923	86·8	121·5
13	Frid.	·841	·669	·755	81·8	104·0	22·2	Lgt. haze.	Clear.	Lgt. clds.	S W	S W	W	...	100·5	68·5	32·0	...	100·5	62·0	38·5	...	...	...	...	·952	86·5	122·5
14	Sat.	·825	·652	·738	78·6	104·0	25·4	Clear.	Lgt. haze.	Cloudy.	S W	W N W	W	...	102·6	70·3	32·3	...	102·5	59·5	43·0	...	...	...	...	·931	87·2	120·5
15	Sun.	·902	·777	·839	83·8	100·1	26·3	Den. haze	Den. haze.	Haze.	E	E	E	...	95·4	70·5	24·9	...	95·5	60·0	35·5	...	...	...	...	·946	86·1	116·5
16	Mon.	·891	·717	·804	83·0	102·4	19·4	Haze.	Lgt. haze.	Lgt. clds.	W	W S W	W	...	98·5	69·4	29·1	...	98·5	62·0	36·5	...	...	...	...	·944	87·2	119·5
17	Tues.	·862	·651	·756	79·0	104·0	25·0	Lgt. clds.	Lgt. clds.	Fair.	W	W	W S W	...	99·0	71·2	27·8	...	99·0	61·5	37·5	...	...	...	...	·906	87·0	124·0
18	Wed.	·848	·672	·760	78·6	104·0	25·4	Cloudy.	Lgt. clds.	Cloudy.	E	W	S W	...	98·4	73·1	25·3	...	98·5	61·0	37·5	...	...	...	...	·905	88·1	123·0
19	Thur.	·854	·690	·772	76·0	104·1	28·1	Cloudy.	Cloudy.	Cloudy.	S E	S	S W	...	97·5	72·5	25·0	...	97·5	59·5	38·0	...	...	...	...	·878	87·5	113·5
20	Frid.	·835	·674	·754	77·2	99·4	22·2	Lgt. clds.	Lgt. clds.	Cloudy.	S E	E S E	S S W	...	94·2	74·5	19·7	...	94·0	60·5	33·5	...	...	...	...	·795	86·2	119·0
21	Sat.	·847	·679	·763	79·1	97·6	18·5	Lgt. clds.	Clouds.	Lgt. clds.	W	W	W	...	92·7	74·3	18·4	...	92·5	62·0	30·5	...	...	...	...	·769	85·6	117·5
22	Sun.	·839	·662	·750	78·4	97·3	18·9	Lgt. clds.	Clouds.	Lgt. clds.	W	N W	S	...	94·7	74·5	20·2	...	94·5	61·0	33·5	...	·120	...	·117	·766	85·0	122·0
23	Mon.	·836	·671	·753	79·6	100·6	21·0	Lgt. clds.	Lgt. clds.	Lgt. clds.	S E	W	W	...	97·6	76·2	21·4	...	97·5	62·0	35·5	...	...	...	...	·848	85·0	120·5
24	Tues.	·849	·687	·768	80·8	100·5	19·7	Clear.	Lgt. clds.	Lgt. clds.	E	W	W	...	96·2	71·6	24·6	...	96·0	61·5	34·5	...	...	...	...	·869	86·4	118·0
25	Wed.	·844	·683	·763	78·6	100·2	21·6	Clear.	Clear.	Lgt. clds.	S W	S W	S S W	...	96·4	71·8	24·6	...	96·5	61·5	35·0	...	...	...	...	·821	86·5	118·0
26	Thur.	·766	·641	·703	79·1	101·6	22·5	Hazy.	Lgt. clds.	Lgt. clds.	N E	S	S W	...	98·2	71·7	26·5	...	98·5	61·5	37·0	...	...	...	...	·849	87·0	116·5
27	Frid.	·806	·682	·744	80·0	100·0	20·0	Clear.	Clear.	Cloudy.	W	S W	W	...	97·6	71·9	25·7	...	97·5	62·0	35·5	...	...	...	...	·836	85·0	113·0
28	Sat.	·843	·686	·764	80·7	100·6	19·9	Clear.	Clear.	Cloudy.	E	N W	W	...	94·3	71·8	22·5	...	94·5	62·0	32·5	...	...	...	...	·860	85·6	120·5
29	Sun.	·866	·727	·796	83·5	103·3	19·8	Lgt. clds.	Clear.	Lgt. clds.	S W	S S W	S	...	100·8	73·8	27·0	...	101·0	63·5	38·5	...	...	...	...	·940	87·2	124·0
30	Mon.	·839	·657	·748	81·8	105·4	23·6	Hazy.	Clear.	Lgt. clds	W	W	W	...	102·0	70·1	31·9	...	102·0	64·5	37·5	...	...	...	...	·927	87·4	124·5

SUMMARY.

Mean of Barometer, reduced to 32° Fahrenhiet..		Inches.	28·768
Mean of Maximum..... Temperature..	Per Register Instruments in open Verandah facing North.....	°	101 3
Mean of Minimum.. ..... Temperature..	Per Register Instruments in open Verandah facing North.....		78 9
Mean of Standard Thermometer...			86 6
Mean of Daily Range..			22 7
Mean Temperature of Month..			90 1
Highest Maximum occurred on 30th..			105 4
Lowest Minimum occurred on 3rd..			72 0
Mean Temperature in Sun per Black Bulb..			118 8
Mean of Evaporation..		Inches	·865
Mean of Dew Point at Noon..			59° 3′
Fall of Rain..		Inches	·120
Difference of results given by upper and lower Pluviometers, the former being elevated 13 feet..		Inches	·003
Prevailing Winds..			W. and W. S. W.

OBSERVATIONS.

APRIL.—As alluded to in the foregoing notice, the dense haze of the three last days of March continued to the 2nd of this month. It was very dense on the 1st, and rather less so on the 2nd. The opposite hills were sometimes invisible, and the sun could be viewed with the unprotected eye until he attained an altitude of 30° or 35°, having all the appearance of a dis- of silver, and the same transpired when about an equal number of degrees above the western horizon. On these days an impalpable dust fell and covered all things. Not a cloud was to be seen, but this uniform and general haze mantled everything day and night,—the moon and some stars of the first magnitude only being visible at night. These observations apply equally to the last three days of March. On the 5th, the mean of Barometer indicated ·079 less than on the previous day. On the 6th, there was a small rise, and at 3 P. M. commenced a high wind from west, which continued on the 7th, 8th, and 9th, shifting a point or so to the south; the mercury falling gradually till it was only 28·728 on the 9th, when a dust storm and half a gale of wind was experienced from 11 A. M. to 3 P. M. On this last day, likewise, a Meteor was seen in E. S. E. at 7·15 P. M., about the size and brilliancy of Venus: when first seen it was at an elevation of 30°, and descended almost perpendicularly. Subsequently the barometer rose for two days. The 15th was a very hazy day, and the 16th rather less so, but no dust was observed analogous to that in March and early days of this month. On the afternoon of 18th, a storm of thunder and lightning, and a little rain; on the 19th, a few light, very short showers; on the 20th, thunder and lightning at sun set, with high wind from S. and S. W.; and on the 21st at 2·30 min. P. M., heavy rain with thunder and lightning from S. E. occurred.

With the aid of tatties the house could be kept cool, but the air outside was intolerably hot. The rain that fell this month appeared to have influenced the temperature. In April 1847 and 1848 no rain took place.

Mean temperature of April 1847, 93°2; 1848, 92°3; 1849, 90°1; extreme difference of 3°1.

The Barometer had a downward tendency throughout the month.

The temperature of the well was 80°4 from a mean of five observations.

Sickness had increased generally, especially diseases of the febrile type. Two deaths had to be recorded, one European infant and one prisoner.

PHASES OF THE MOON, APRIL, 1849.

	D.	H.	M.	
Full Moon..	7	9	0	A.
Last Quarter..	16	0	18	M.
New Moon..	23	5	5	M.
First Quarter..	29	7	28	A.

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HOSHUNGABAD METEOROLOGICAL OBSERVATIONS, MAY, 1849.

Days of the Month.	Days of the Week.	Means of Two Barometers corrected to 32° Fahrenheit. A. M. 9 to 10.	P. M. 3·30 to 4·30.	Mean.	Register Therm. in open verandah, facing North. Minimum.	Maximum.	Daily Range	Aspect of Sky. Morning.	Noon.	Evening.	Wind. Morning.	Noon.	Evening.	Mason's and Daniell's Hygrometers. Time.	Dry Bulb.	Wet Bulb.	Difference.	Time.	Amb. Air.	Dew Point.	Difference.	Rain Gauges. On Ground. Inch.	Dec.	Elevated 13 Feet. Inch.	Dec.	Evaporation. Inches.	Standard Therm. taken daily in closed house. At 2 P. M.	Black Bulb Register Therm. in Sun Maximum.
		In	In.	In.																								
1	Tues.	28·845	28·669	28·757	89·0	105·6	16·6	Clear.	Cloudy.	Lgt. clds.	W	W	W	Noon.	100·3	72·8	27·5	Noon.	100·0	68·5	31·5	...	...	...	...	·989	91·3	124·5
2	Wed.	·837	·708	·772	81·3	105·7	24·4	Cloudy.	Cloudy.	Cloudy.	N W	W	S W	...	99·5	73·2	26·3	...	99·5	66·0	33·5	...	...	...	...	·873	86·5	125·0
3	Thur.	·92	·700	·811	82·5	103·4	20·9	Clouds.	Clouds.	Clouds.	S W	W	W by S	...	97·4	74·[illegible]	22·6	...	97·5	65·5	32·0	...	...	...	...	·78	86·2	122·0
4	Frid.	·868	·663	·765	79·7	100·4	21·7	Lgt. clds.	Lgt. clds.	Lgt. clds.	S W	S W	S W	..	94·3	71·2	2[illegible]·1	...	94·0	66·0	28·0	...	...	...	...	·752	84·6	117·0
5	Sat.	·919	·709	·809	80·5	103·5	2[illegible]·5	Lgt. clds.	Fair.	Lgt. clds.	W	W	W	...	96·0	70·2	25·8	...	96·0	64·5	31·5	...	...	...	...	·854	87·2	119·5
6	Sun.	·828	·689	·758	81·0	1[illegible]2·2	21·2	Fair.	Lgt. clds.	Hazy.	W	W	N W	...	100·0	7[illegible]·8	[illegible]9·2	...	100·0	68·0	32·0	...	...	...	...	·931	87·7	121·0
7	Mon.	·906	·702	·804	80·5	104·3	23·8	Clear.	Clear.	Lgt. clds.	S W	N W	N	...	101·2	70·4	30·8	...	101·0	66·0	35·0	...	...	...	...	·848	87·1	124·0
8	Tues.	·8[illegible]9	·667	·718	81·1	105·5	2[illegible]·4	Clear.	Clear.	Clear.	E	S E	W	...	103·1	71·0	32·1	...	103·0	67·0	36·0	...	...	...	...	·886	87·9	125·5
9	Wed.	·753	·574	·663	82·8	109·8	27·0	Clear.	Clear.	Clear.	E	S E	S E	...	103·8	71·6	3[illegible]	...	103·5	68·5	35·0	...	...	...	...	·957	88·0	129·0
10	Thur.	·762	·591	·676	82·4	109·9	27·5	Clear.	Clear	Clear.	W	S	N W	...	107·5	71·6	35·[illegible]	...	107·5	68·0	39·5	...	...	...	...	·961	88·4	129·5
11	Frid.	·789	·604	·696	94·3	111·2	16·9	Haze.	Very hazy	Lgt. haze.	W N W	N W	N W	...	106·1	73·4	32·7	...	106·0	77·5	28·5	...	...	...	...	·957	93·5	129·0
12	Sat.	·670	·5[illegible]8	·5[illegible]9	91·0	110·6	19·6	Hazy.	Hazy.	Hazy	W N W	N W	N W	...	106·8	73·8	33·0	...	106·5	77·5	29·0	...	...	...	...	·907	94·2	125·0
13	Sun.	·679	·478	·578	89·3	110·4	21·1	Lgt. haze.	Lgt. haze.	Lgt. clds.	W N W	N W	W by N	...	105·2	72·6	32·[illegible]	...	105·0	77·0	28·0	...	...	...	...	·876	87·8	124·5
14	Mon.	·661	·493	·578	89·1	106·3	17·2	Lgt. haze.	Clear.	Hazy.	W	W by S	W by S	...	102·0	72·[illegible]	29·9	...	102·0	76·0	26·0	...	...	...	...	·804	86·5	123·0
15	Tues.	·7[illegible]6	·530	·623	87·1	107·2	20·1	Lgt. haze.	Lgt. haze.	Haze.	W	W S W	W	...	105·2	70·6	34·6	...	105·0	76·0	29·0	...	...	...	...	·790	88·6	120·0
16	Wed.	·736	·560	·648	86·0	105·6	19·6	Hazy.	Hazy.	Lgt. clds.	W by S	S W	W S W	...	101·0	71·[illegible]	29·[illegible]	...	101·0	74·0	27·0	...	...	...	...	·791	88·5	119·0
17	Thur.	·736	·555	·645	87·2	104·3	17·1	Lgt. clds.	Fair.	Lgt. clds.	W by S	W S W	S W	...	100·2	74·8	25·4	...	100·0	75·0	25·0	...	...	...	...	·75[illegible]	87·6	121·5
18	Frid.	·673	·536	·604	86·7	104·0	17·3	Clear.	Clear.	Clear.	S W	S W	W N W	...	100·0	75·1	24·9	...	100·0	72·5	27·5	...	...	...	...	·815	87·8	119·5
19	Sat.	·725	·560	·642	84·8	104·0	19·2	Clear.	Hazy.	Lgt. clds.	S W	S W	S S W	...	102·3	77·8	24·[illegible]	...	102·5	73·0	29·5	...	...	...	...	·760	88·2	120·0
20	Sun.	·738	·617	·677	87·8	102·5	14·7	Lgt. clds.	Lgt. clds.	Lgt. clds.	S W	S S W	W	...	101·2	78·6	22·6	...	100·0	70·0	30·0	...	...	...	...	·876	88·0	120·5
21	Mon.	·745	·621	·683	82·9	103·2	20·3	Cloudy.	Cloudy.	Cloudy.	W	W	S E	...	100·1	79·6	20·[illegible]	...	100·0	69·5	30·5	...	·117	...	·117	·795	88·4	126·0
22	Tues.	·719	·620	·669	74·[illegible]	107·5	32·9	Cloudy.	Lgt. clds.	Lgt. clds.	E	W	N E	...	97·4	79·4	18·0	...	97·5	69·5	28·0	..	·490	...	·49[illegible]	·621	87·0	121·0
23	Wed.	·713	·608	·660	81·3	103·8	21·5	Lgt. clds.	Fair.	Fair.	W	S S E	N	...	98·5	79·4	19·	...	98·5	70·0	28·5	...	·120	...	·12[illegible]	·761	88·9	121·0
24	Thur.	·724	·633	·678	83·2	103·1	19·9	Clear.	Clear.	Clear.	W	W by S	W	...	99·6	79·3	20·3	...	99·5	69·0	30·5	...	...	...	...	·810	89·2	121·0
25	Frid.	·731	·601	·6[illegible]6	83·8	10[illegible]·8	[illegible]·0	Clear.	Cloudy.	Lgt. clds.	S S W	S W	S W	...	99·8	79·0	20·8	...	99·5	68·5	31·0	...	...	...	...	·85[illegible]	89·0	122·5
26	Sat.	·718	·594	·656	85·1	105·7	20·6	Lgt. clds.	Fair.	Hazy.	S W	W	W	...	102·8	78·4	24·4	...	103·0	71·0	32·0	...	...	...	...	·861	89·1	124·5
27	Sun.	·711	·580	·645	85·0	10[illegible]	21·8	Lgt. clds.	Lgt. clds.	Clear.	W	W	S W	...	103·6	78·5	25·1	...	103·5	70·0	33·5	...	...	...	...	·9[illegible]2	88·7	125·0
28	Mon.	·704	·572	·638	84·7	108·6	23·9	Clear.	Lgt. clds.	Lgt. clds.	W	W	W by N	...	104·5	77·5	27·0	...	104·5	69·5	35·0	...	...	...	...	·916	89·6	125·5
29	Tues.	·698	·591	·644	88·1	108·3	20·2	Lgt. clds.	Clear.	Clear.	N W	W	S S W	...	103·7	77·0	26·7	...	103·5	74·0	29·5	...	...	...	...	·897	90·0	125·5
30	Wed.	·702	·587	·644	90·3	108·4	18·1	Clear.	Lgt. clds.	Clouds.	E by S	S W	S W	...	105·0	77·6	27·4	...	105·0	75·0	30·0	...	...	...	...	·915	89·5	126·5
31	Thur.	·681	·563	·622	88·8	106·7	19·9	Lgt. clds.	Lgt. clds.	Cloudy.	S W	S W	S W	...	105·8	77·8	28·0	...	106·0	74·5	31·5	...	...	...	...	·904	89·2	124·5

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SUMMARY.

Mean of Barometer reduced to 32° Fahrenheit.. .. .. Inches				28·679
			°	′
Mean of Maximum.....	Temperature..	Per Register Instrument in open	105	9
Mean of Minimum..		Verandah facing North.....	84	9
Mean of Standard Thermometer..			88	5
Mean of Daily Range..			17	8
Mean Temperature of the Month..			95	4
Highest Maximum occurred on 11th..			111	2
Mean of Temperature in Sun per Black Bulb Instrument..			123	0
Lowest Minimum occurred on 22nd..			74	6
Mean of Evaporation.. .. .. Inches.				·558
Mean of Dew Point at Noon..			70°	5′
Prevailing Winds.. .. .. W. and W. S. W.				
Fall of Rain.. ... . Inches.				·727
Difference of results given by upper and lower Pluviometers, the former being elevated 13 feet... ... ... Inches				None.

OBSERVATIONS.

MAY.—Thunder and lightning at intervals, and very partial and light showers occurred on the 2nd, 3rd, and 4th. The sky was generally overcast throughout the month, and there were but four entirely clear days. The indications of the barometer were steadily decreasing, although the instrument seemed incapable of being actuated by ærial changes and commotions, as may be gleaned from inspection of the register when rain fell on 20th, 21st and 22nd, (quantities registered the following mornings at 6 o'clock,) and when likewise on the latter day at 3·30 P. M. a very strong gale of wind from North was experienced. During this period no irregular falling of the column could be detected;—the daily mean, indeed, was in a measure higher. The readings, however, were much lower on 27th, 28th, 29th, and 31st, when thunder and lightning occurred each afternoon.

The mean temperature in the house had increased 2° nearly on that of last month, but was exactly that of May 1848, 88°5. This is the hottest mon h of the year.

The mean temperature and the fall of rain of this month for 3 years stand thus:

Mean temperature of May 1847, 98°2; 1848, 96°8; 1849, 9.°4.

Fall of Rain.. 1847, In. ·570; 1848, 1·137; 1849, ·727;—extreme difference 2°3, and a decrement of 1°4 in each year precisely. The May of 1847 was hottest and had the least rain, and in both 1847 and '48 the rain fell only on the last 4 and 3 days, respectively, of the month, whils tthis year it commenced on the 20th, and this probably had some effect in producing the lesser temperature of the past May. The temperature of spring, from a mean of nine observations, was 80°7.

No difference in the results given by the elevated and ground pluviometers was traceable this month; an anomalous circumstance which needs investigation. But many instances, under all conditions of the atmosphere, must be obtained before any solution of the cause can be arrived at. In May 1848 the fall of rain was 1·137 on ground, and 1·118 thirteen feet above, making a difference of ·019. An identical anomaly occurred in the first half of June of that year. The self-same instruments have all along been used, and their position alternated as stated.

The station was generally sickly—Fever and Dysentery prevalent and severe. 3 Casualties had to be noted—1 European infant, 1 Sepoy, and 1 Prisoner.

PHASES OF THE MOON, MAY 1849.

	D.	H.	M.	
Full Moon..	7	0	17	A.
Last Quarter..	15	3	41	A.
New Moon..	22	0	47	A.
First Quarter....	29	4	34	M.

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HOSHUNGABAD METEOROLOGICAL OBSERVATIONS, JUNE 1849.

Days of the Month.	Days of the Week.	Means of Two Barometers corrected to 32° Fahrenheit. A. M. 9 to 10.	P. M. 3·30 to 4·30.	Mean.	Register Therm. in open veranda, facing North. Minimum.	Maximum.	Daily range.	Aspect of Sky. Morning.	Noon.	Evening.	Wind. Morning.	Noon.	Evening.	Mason's and Daniell's Hygrometers. Time.	Dry Bulb.	Wet Bulb.	Difference.	Time.	Amb. Air.	Dew Point.	Difference.	Rain Gauges. On Ground. Inches.	Dec.	Elevated 13 Feet. Inches.	Dec.	Evaporation. Inches.	Standard Therm. taken daily in Garden. At 2 P. M.	Black Bulb Registered Ther. in Sun. Maximum.
		In.	In.	In.																								
1	Frid.	28·750	28·548	28·649	90·0	109·1	19·1	Lgt. clds.	Clear.	Lgt. clds.	W	W	S W	Noon.	105·5	77·4	28·1	Noon.	105·5	76·0	29·5	...	...	...	...	·984	90·1	127·5
2	Sat.	·733	·529	·631	89·0	108·6	19·6	Lgt. clds.	Clear.	Lgt. clds.	S W	S W	S W	...	104·2	77·0	27·2	...	104·0	76·0	28·0	...	...	...	...	·984	91·3	127·0
3	Sun.	·726	·488	·607	89·6	108·6	19·0	Hazy.	Clear.	Hazy.	W by S	S W	W by N	...	101·9	77·9	23·9	...	101·5	76·0	25·5	...	...	...	...	·977	90·6	127·0
4	Mon.	·613	·464	·553	89·9	110·5	20·6	Hazy.	Clear.	Hazy.	N W	S W	S E	...	105·6	80·0	25·6	...	105·5	77·5	28·0	...	...	...	...	·979	91·2	129·5
5	Tues.	·673	·572	·622	89·5	104·0	14·5	Hazy.	Hazy.	Hazy.	S S W	S W	S S W	...	101·3	80·4	20·9	...	101·5	77·0	24·5	...	...	...	...	·979	91·2	129·5
6	Wed.	·732	·593	·662	89·5	109·2	19·7	Fair.	Clear.	Cloudy.	S W	W	S W	...	105·2	80·2	25·0	...	105·0	78·5	21·5	...	...	...	...	·820	90·4	118·0
7	Thur.	·691	·488	·589	85·8	107·6	21·8	Fair.	Lt. clds. H.	Cloudy.	W by S	S W	E by S	...	101·9	79·0	22·9	...	102·0	78·0	24·0	...	...	...	...	·912	90·8	126·5
8	Frid.	·643	·477	·560	87·2	105·7	18·5	Clear.	Lgt. clds.	Cloudy.	W	S W	S	...	100·0	81·0	19·0	...	100·0	78·0	22·0	...	...	...	...	·793	89·2	126·0
9	Sat.	·661	·481	·571	85·6	104·2	18·6	Lgt. clds.	Hazy.	Cloudy.	W S W	S W	S	...	100·0	80·1	19·9	...	100·0	78·0	22·0	...	...	...	...	·757	89·4	121·0
10	Sun.	·687	·488	·587	85·8	105·0	19·2	Clear.	Clear.	Cloudy.	W	W	N E	...	99·0	80·4	18·6	...	99·0	78·5	20·5	...	...	...	...	·697	87·8	122·0
11	Mon.	·643	·484	·563	86·6	101·1	20·5	Lgt. clds.	Haze.	Cloudy.	S W	W	S S W	...	97·8	80·5	17·3	...	98·0	79·0	19·0	...	·127	...	·127	·532	93·5	120·5
12	Tues	·649	·486	·567	84·0	102·8	18·8	Lgt. clds.	Lgt. clds	Den. haze	W	S W	W	...	97·1	81·8	15·3	...	97·0	78·5	18·5	...	...	...	...	·609	89·4	119·0
13	Wed	·657	·439	·545	84·7	105·1	20·4	Lgt. clds.	Lt. clds. H.	Cldy, hazy	S W	W	W	...	99·8	81·2	18·6	...	100·0	78·5	21·5	...	...	...	...	·696	90·0	121·0
14	Thur.	·619	·500	·559	82·2	102·2	20·0	Lgt. clds.	H. Lt. clds.	Haze cldy.	S W	S W	S W	...	94·4	80·7	13·7	...	94·5	77·0	17·5	...	·018	...	·018	·571	90·0	121·0
15	Frid.	·652	·460	·556	83·0	102·4	19·4	Cloudy.	Hazy cldy.	Cloudy.	S W	W by S	S W	...	95·1	77·0	18·1	...	95·0	77·0	18·0	...	...	...	...	·589	89·2	119·0
16	Sat	·616	·457	·536	84·5	102·1	17·6	H. Lt. clds.	Haze cldy.	Cloudy.	S W	S W	E S E	...	95·4	79·7	15·7	...	95·5	79·5	16·0	...	...	...	...	·562	91·6	118·0
17	Sun.	·682	·528	·605	79·6	92·0	12·4	Cloudy.	Lgt. clds.	Lgt. clds.	S W	S W	W	...	88·9	79·0	9·9	...	89·0	81·5	7·5	2	·345	2	·425	·198	89·0	114·0
18	Mon.	·636	·53	·583	79·9	91·1	11·2	Cloudy.	Cloudy.	Cloudy.	S W	W S W	S W	...	91·6	78·4	3·2	...	91·5	82·5	9·0	...	·080	...	·072	·185	86·4	104·5
19	Tues.	·659	·521	·591	78·6	82·3	3·7	Cloudy.	Cloudy.	Cloudy.	S W	S W	S W	...	80·1	77·6	2·5	...	80·0	76·0	4·0	...	·205	...	·200	·134	81·4	...
20	Wed.	·617	·531	·574	79·0	82·9	3·9	Cloudy.	Cloudy.	Cloudy.	S W	S W	S W	...	80·7	77·6	3·1	...	81·0	76·0	5·0	...	·306	...	·300	·163	81·2	...
21	Thur.	·605	·455	·530	79·1	87·6	8·5	Cloudy.	Fair cldy.	Cloudy.	S W	W	W by S	...	85·4	79·5	5·9	...	85·5	77·0	8·5	...	·4·9	...	·429	·232	85·4	102·0
22	Frid.	·4·3	·342	·382	75·8	82·6	6·8	Cloudy.	Cloudy.	Cloudy.	W by S	S W	S W	...	79·0	77·2	1·8	...	79·0	74·5	4·5	...	·059	...	·054	·140	81·8	...
23	Sat.	·454	·350	·402	74·9	85·3	10·4	Cloudy	Fair cldy.	Fair cldy.	S W	S W	S W	...	81·0	77·5	3·4	...	81·0	74·5	6·5	2	·025	1	·918	·149	82·4	...
24	Sun.	·499	·434	·466	75·0	86·1	11·1	Cloudy.	Fair.	Cloudy.	S W	W	S W	...	83·5	79·8	3·7	...	83·5	75·0	8·5	1	·923	1	·900	·204	83·5	102·0
25	Mon.	·589	·521	·555	78·0	86·5	8·5	Cloudy.	Fair.	Cloudy.	S W	S W	S W	...	88·0	79·9	8·1	...	88·0	72·6	16·0	...	·639	...	·632	·380	84·4	103·5
26	Tues.	·654	·560	·607	77·8	87·2	9·4	Cloudy.	Lgt. clds.	Lgt. clds.	W S W	S W	S W	...	84·8	77·6	7·2	...	84·5	72·0	12·5	...	·126	...	·120	·343	86·1	...
27	Wed.	·682	·561	·621	79·4	88·3	8·9	Lgt. clds.	Fair.	Lgt. clds.	S S W	S W	S W	...	86·0	77·6	8·6	...	86·0	73·5	12·5	...	·006	...	005	350	87·0	103·0
28	Thur.	·637	·509	·573	79·5	88·8	9·3	Cloudy.	Fair.	Lgt. clds.	W	S W	S S W	...	86·0	76·1	9·9	...	86·0	73·5	12·5	...	...	...	...	·369	86·3	99·5
29	Frid.	·6·9	·483	·561	79·8	91·0	11·2	Fair.	Fair.	Cloudy.	S S W	S S W	S W	...	88·0	75·4	12·7	...	88·0	74·0	14·0	...	...	...	...	·403	87·5	...
30	Sat.	·649	·514	·581	69·0	87·2	18·2	Lgt. clds.	Fair.	Lgt. clds.	N E	E	E	...	81·5	76·5	5·1	...	81·5	73·5	8·0	...	·788	...	·739	·172	83·8	103·0

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SUMMARY.

Mean of Barometer reduced to 32° Fahrenheit..			Inches 28·566
Mean of Maximum.....	Temperature..	Per Register Instrument in open Verandah facing North.....	° ′ 96 9
Mean of Minimum.....			82 2
Mean of Standard Thermometer..			87 6
Mean of Daily Range..			14 6
Mean Temperature of the Month..			89 5
Highest Maximum occurred on 4th..			110 5
Lowest Minimum occurred on 30th..			69 0
Mean of Temperature in Sun per Black Bulb Instrument..			116 4
Mean of Evaporation..			Inches. ·519
Mean of Dew Point at Noon..			76° 0′
Prevailing Winds..			S. W.
Fall of Rain..			Inches. 9·076
Difference of results given by upper and lower Pluviometers, the former being elevated 13 feet...			Inches 0·139

OBSERVATIONS.

JUNE.—The first few days were hazy and cloudy, and on the 6th, at 5 P. M., a few drops of rain preceded thunder and lightning, which continued till 11 P. M., the wind at about the middle of the storm was from E. and S. E. A storm of thunder and lightning took place on the evening of the 7th. Much vivid lightning instantaneously followed by stunning peals of thunder, and high wind on the evenings of 8 h, 9th, and 10th. A few drops of rain on the two first days, and a brisk shower on the last occurred: the wind on the 9th was from N. W., and on the 10th from N. E. The barometer gradually sunk from the 6th. On the 13th, at 10 P. M., and on the 14th at 8·30 P M, thunder and lightning and half a gale of wind visited us from N. W., succeeded by a little rain, sufficient to guage on the 13th only. On the 16th rain, ushered in with loud continuous thunder and very vivid lightning, fell in torrents at 6 P. M., thermometer sinking rapidly from 95° to 80°. The weather subsequently continued rainy and cloudy (excepting the 17th and 28th, which were moderately fair, and free from rain) with decreasing thunder and lightning to the end of the month. The 22nd and 23rd were remarkable for the great and sudden diminution of pressure that was then exhibited, yet no violent atmospheric phenomena resulted—the amount of rain only registered the two ensuing days was large: the column commenced rising again on the 25th. Below the mean readings of two barometers for several hours on the 22nd has been given.

The Mean temperature and fall of rain for June in three years were :—

Mean temperature of June 1847, 87°5; 1848, 88°1; 1849, 89°5.

Fall of rain inches 1847, 4·160; 1848, 6·511; 1849, 9·076, —giving an extreme difference of 2°0.

Here the June of '49 has the highest range and the greatest fall of rain, and to account for this, in a great measure, it must be mentioned that in the corresponding months of 1847 and 1848, the rain fell in the early part, whereas in that of '49 no rain of moment fell till the 16th (registered the following morning) consequently the thermometer was maintained at a higher range for 16 days longer than in the previous years. During June 1848 all the rain fell prior to the 21st, and in 1847, at irregular intervals from 1st to near the close of the month. The temperature of the spring was 80·8 as the mean of eight observations.

The remarks to be found in last month's notes in reference to the rain measured by upper and lower pluviometers are applicable to the amounts set down in the rain columns opposite to the 14th and 21st dates of this month, and it will not escape notice that the rain shown on the 17th by upper pluviometer actually exceeded by ·080 that indicated by the lower! The same extraordinary discrepancy occurred on the 12th August 1848. These, however, are the only two instances that have come to my knowledge. As I invariably measure the rain with the utmost care, and with the same measures, well levelled, one of which is graduated to cubic inches, and the other, a small one, to 1-10ths of cubic inch, I am enabled to assert positively that in errors of this operation the cause of parity or plusage cannot reside. Neither can the measurement be attributed to the wrong rain guage, since that on the ground is always registered first, and then carried up to replace the elevated one which is brought to be measured, and remains for its tour below.

I will here remark, in anticipation, that the mean temperatures of September 1847 and 1848 were 80°0 and 80°8, and it will be seen that the mean deduced from the 6 preceding monthly means of the spring 75 feet below the surface is 80°1. On the other hand the mean temperature of 1847 was 79°1, and of 1848 80°5. Any such accordance in the approaching September will do much to establish it as a physical law of this, as it is apparently with many other localities; i. e. the mean of September corresponds with the mean annual temperature of a place.

As far as I have yet proceeded roughly with the investigation, I find that the theorem of Kirwan, with corrections for modifications, gives a very close approximation to the annual mean temperature derived by actual observation, in respect to this place. It will be necessary to recur to this subject at the close of the year.

Date.	Hour.	Barometer corrected to 32°
June.	A. M.	Inches.
22	6	28·420
"	7	·418
"	9·15	·423
"	10	·423
"	11·30	·409
"	P. M. 1	·372
"	2·30	·357
"	3·30	·350
"	4·30	·350
"	6	·361
"	7	·360
"	10	·379
23	A. M. 6	·432

PHASES OF THE MOON, JUNE 1849.

	D.	H.	M.
Full Moon..	6	3	37 M.
Last Quarter..	14	3	35 M.

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Hoshungabad Meteorological Observations, May, 1850.—*Lat.* 22° 41′ 9″ *N.*—*Long.* 77° 53′ 45″ *E.*—*Var.* 1° 15′ *E.*—*Dip.* 24° 55′.

Days of the Month.	Observations at Sunrise.						Maximum Pressure at 9h. 50m.						Observations at Apparent Noon.					
	Barometer unreduced.	Temperature.			Wind.	Aspect of Sky.	Barometer unreduced.	Temperature.			Wind.	Aspect of Sky.	Barometer unreduced.	Temperature.			Wind.	Aspect of Sky.
		Of the Mer.	External. Of Air.	External. W. Bulb.	Direction from Sunset to Sunrise.			Of the Mer.	External. Of Air.	External. W. Bulb.	Direction from Sunrise 9h. 50m.			Of the Mer.	External. Of Air.	External. W. Bulb.	Direction from 9h. 5m. to noon.	
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
1	28·945	79·5	80·4	67·3	1 W by S	Clear	29·015	81·5	94·7	68·5	2 W S W	Clear	28·951	83·0	101·6	70·3	2 W S W	Clear
2	29·002	78·5	78·5	60·4	1 S W	Clear	29·028	81·5	95·1	70·9	2 W	Clear	·940	83·5	100·4	71·6	2 W	Clear
3	28·993	81·5	81·3	64·7	1 S by W	Clear	28·994	85·0	99·6	69·1	1 W by S	Clear	·961	86·5	100·0	72·5	2 S W	Clear
4	·952	83·0	87·3	65·8	1 W	Cirri	·973	87·0	99·1	69·8	2 W by S	Clear	·976	87·0	103·3	70·4	2 W	Clear
5 S.	·880	82·0	83·4	63·7	1 W S W	Cir. Strat	·950	85·0	97·0	70·5	2 W S W	Cirri	·843	85·0	101·7	73.9	0 S E	Cum.
6	·833	81·0	81·2	62·2	1 W	St. Cirri	·937	82·0	95·2	72·0	1 W by S	Clear	·834	82·5	102·4	74·1	3 S W	Clear
7	·925	79·0	79·3	63 0	1 E S E	St. Cir.	·934	82·0	92·6	74·3	2 W S W	Clear	·852	83·0	99·2	74·5	1 W	Cir. Str.
8	·953	78·0	77·7	69·3	0 S W	Clear	29·000	86·5	89·1	71·4	3 W	Clear	·908	85·5	98·4	73·4	2 S W	Cir. Cum.
9	·937	80·5	79·3	60·0	2 S W	Clear	28·970	82·0	94·1	69·8	2 W S W	Clear	·913	82·0	97·6	71·8	2 W by S	Clear
10	·934	80·0	79·3	61·3	1 W S W	Clear	·999	82·0	92·3	72·1	2 W S W	Clear	·896	82·5	96·9	71·7	1 S W	Clear
11	·922	83·0	83·0	63 9	2 S W	Clear	·983	82·5	93·8	73·7	0 W	Clear	·895	83·0	98·4	73·5	0 W	Cir. Cum.
12 S.	·973	84·0	83·3	68·2	1 S W	Cir. Strat	·995	81·0	93·0	72·1	0 E	Clear	·914	83·5	98·3	71·3	3 S W	Cir. Str.
13	·962	83·0	83·1	63·3	W S W	Cir. Str.	29.004	84·0	93·4	70·6	0 W	Clear	·922	84·0	100·4	73·8	0 E S E	Cirri
14	·929	84·0	84·8	68·2	2 W	Cirri	28·971	81·5	89·6	70·8	2 W	Dull Cir. Haze	·895	82·5	96·0	72·4	3 W	Cir. Haze
15	·914	83·5	81·3	68·3	1 W S W	Cir. Haze	·953	83·5	95·5	70·4	0 W	Cirri	·858	83·5	99·4	72·9	1 W S W	Clear
16	·932	83·0	80·1	63·8	0 E S E	Clear	·982	82·0	94·0	67·3	2 W S W	Cir. Haze	·909	82·5	97·8	71·3	2 S W	Cir. Haze
17	·933	82·0	77·5	62·0	1 E S E	Clear	·979	82·5	94·6	70·7	0 W	Clear	·912	83·0	98·4	71·4	1 W	Haze
18	·949	81·5	79·4	62·6	0 S W	Clear	·925	83·0	94·4	70·0	0 E by S	Clear	·933	83·0	100·8	70·2	1 W	Clear
19 S.	29·023	82·5	81·1	62·8	0 E	Clear	29·072	84·0	97·1	69·5	2 E N E	Clear	·999	84·0	103·1	69·6	3 W S W	Clear
20	28·994	82·0	80·7	64·4	1 S W	Clear	·042	83·5	98·7	69·2	1 E by S	Clear	·946	83·5	104·2	71·4	1 E S E	Clear
21	·935	85·0	86·0	66·0	1 W S W	Cir. Cum.	·980	83·5	101·7	68·5	2 W	Clear	·964	84·5	104·0	70·9	0 S E	Cum. Str.
22	·957	84·0	83·8	62·5	2 W by S	Clear	28·962	85·0	98·9	69·9	3 W	Clear	·930	85·0	102·9	70·4	2 E N E	Clear
23	·903	84·0	83·2	63·0	2 S W	Clear	·983	84·0	102·0	69·4	3 S W	Clear	·933	84·5	104·3	71·1	1 W	Cum. Str.
24	·926	84·0	83·3	63·3	1 E	Clear	·968	84·5	100·4	69·7	W by S	Clear	·896	85·0	107·4	71·2	2 W S W	Clear
25	·888	85·0	85·0	66·6	1 S W	St. Cirri	·939	85·5	100·1	72·8	0 W	Clear	·843	86·0	105·8	74·7	0 S E	Hazy Cirri
26 S.	·895	86·0	87·4	67·5	0 N E	Cir. Haze	·884	84·5	99·8	73·9	2 W S W	Cirri	·828	86·0	104·7	74·6	0 W	Hazy Cirri
27	·854	86·5	87·2	68·9	2 W S W	Cir. Haze	·883	85·5	98·4	76·7	3 W S W	Cir. Haze	·804	86·5	99·0	77·4	2 S W	Cir. Haze
28	·881	89·0	89·5	67·3	2 W	Strat	·915	85·5	99·9	73·3	4 W	Cir. Haze	·862	86·0	103·5	74·1	3 W N W	Cir. Haze
29	·838	86·0	87·1	69·9	1 W S W	Cum.	·864	86.5	98·2	76·4	1 W S W	St. Cirri	·801	87·5	105·9	77·2	3 W N W	St. Cirri
30	·805	85·5	86·3	72·8	2 S W	Cum.	·883	85·5	101·4	75·3	2 W N W	Clear	·802	86·5	106·0	77·3	3 W N W	Cum.
31	·869	85·0	83·0	72·9	3 S W	Cum.	·885	85·0	95·1	78·4	3 W	St. Cum.	·824	85·5	100·8	78·6	3 W	Cum.
Means.	28·921	83·0	82·8	65·8	.....	.....	28·961	83·8	96·4	71·5	.....	.....	28.894	84·3	101·3	72·3	.....	.....

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HOSHANGABAD OBSERVATIONS.

Days of the Month.	Observations at 2h. 40m. P. M. Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 2h. 40m.	Aspect of Sky.	Minimum Pressure at 4 P. M. Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 2h 40m. to 4 P. M.	Aspect of Sky.
	Inches.	°	°	°			Inches.	°	°	°		
1	28·859	84·0	105·7	70·7	2 W	Clear	28·863	85·5	104·6	69·8	3 S W	Clear
2	·862	83·5	104·8	72·6	1 W by S	Clear	·848	85·0	103·3	73·0	1 S E	Lt. Haze
3	·866	87·0	106·2	73·5	2 E	Nimbi	·841	87·0	104·7	72·8	2 N	Cirri Strat
4	·836	87·0	104·1	73·3	2 W	Cir. Como.	·818	87·0	100·8	71·2	2 S W	Cum. Str.
5 S.	·788	86·0	104·2	72·5	1 W	Haze Cum.	·784	86·5	104·6	73·4	2 S W	Overct. Cum.
6	·783	82·5	101·6	71·3	3 S W	Cir. Strat	·783	81·0	103·2	72·3	3 W	Clear
7	·794	84·0	98·5	74·9	0 W	Nimbi	·822	82·5	87·2	71·4	2 S W	Overct. Nim.
8	·827	83·5	97·6	72·1	0 W	Cir. Str.	·847	83·5	96·4	72·8	1 W N W	Dull Cum.
9	·830	82·0	99·1	72·4	2 S W	Cum.	·811	82·0	99·6	71·2	0 W	Cir. Str.
10	·855	81·5	99·5	71·4	2 W	Clear	·820	82·0	99·0	70·8	0 W	Cir. Cum.
11	853	82·5	100·7	73·0	0 W	Cir. Str.	·818	82·0	99·7	71·0	2 W S W	Cir. Str.
12 S.	·863	83·5	100·5	73·0	0 W	Cir. Str.	·836	83·0	101·0	72·5	3 W	Cir. Str.
13	·877	83·0	99·3	71·3	1 W by S	Cir. Str.	·840	84·0	101·2	70·0	2 W	Cirri
14	·831	83·0	97·8	71·8	3 W S W	Cir. Cum.	·808	83·0	97·3	73·0	2 W	Clr. Haze
15	·830	83·0	100·4	72·4	3 S W	Cir. Str.	·781	83·0	100·4	71·3	3 W	Cir. Cum.
16	·808	82·5	99·6	71·3	3 W	Cir. Haze	·794	82·0	99·4	69·1	3 W	Cum. Haze
17	·844	81·0	101·3	69·4	W S W	Clear	·840	80·5	100·3	69·5	3 W by S	Clear
18	·900	83·0	101·2	72·3	0 E N E	Clear	·865	82·5	101·9	68·8	2 N W	Clear
19 S.	·925	83·5	104·4	71·3	1 W	Clear	* ·928	84·0	104·3	69·7	2 W	Clear
20	·838	84·0	106·5	72·5	3 E	Clear	* ·870	84·0	105·8	70·4	1 W	Clear
21	·821	85·0	105·6	71·1	1 S W	Cum. Str.	·814	84·5	105·0	79·9	2 W	Cum. Str.
22	·823	85·0	104·8	72·7	0 W	Cum. Str.	·815	85·0	104·1	71·5	2 W	Cum. Str.
23	·842	84·0	106·4	71·5	2 W	Cum. Str.	·829	84·5	106·0	71·1	3 W by S	Cum. Str.
24	·847	85·0	109·0	73·0	2 W by S	Clear	·818	85·5	107·5	72·9	2 S W	Clear
25	·820	86·5	108·1	73·9	3 N N E	Clear	·759	86·0	107·0	75·3	0 E	Cir. Strat.
26 S.	·712	86·5	108·8	75·0	0 W	Cirri	·707	83·0	106·1	75·2	0 W S W	Cum. Str.
27	·737	86·5	107·9	76·4	0 W	Cir. Haze	·720	87·0	108·3	76·8	0 W	Clr. Haze
28	·758	87·0	103·2	74·8	0 W	Cir. Haze	·765	87·0	105·3	74·5	2 W by W	Cir. Str.
29	·740	87·5	98·7	77·6	2 S W	N	·733	87·0	97·1	73·3	3 S W	Nimbi
30	·733	85·0	96·8	76·5	3 W S W	Cum.	·715	85.0	96·3	76·0	3 S W	Nimbi
31	·723	85·5	102·2	74·5	1 W	Cum.	·718	86·0	99·3	77·7	1 W by N	Cumuli
eans.	28·821	84·3	102.2	72·8	.....	.....	28·806	84·3	101·8	72·3	.....	.....

Days of the Month.	Observations at Sunset. Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 4 P. M. to Sunset.	Aspect of Sky.	Under N. Verandah. Maximum in Shade.	Minimum in Shade.	Per Black Bulb Registering Instr. Max. in Sun's Rays.	Rain Gauge on Ground Registered at 6 A. M.	Phases of the Moon.
	Inches.	°	°	°			°	°	°	Inches.	
1	28·879	85·0	105·0	70·7	2 S W	Clear	106·2	78·9	126·5	...	
2	·861	84·5	103·0	69·1	0 S E	Clear	106·8	76·6	126·5	...	
3	·863	87·0	99·4	72·1	2 W S W	Clr. Strat.	106·9	81·0	127·5	...	
4	·819	86·0	99·6	72·2	1 W	Cum. Str.	106·2	85·8	129·0	...	
5	·800	86·0	99·3	72·3	1 W by S	Dull Cum.	106·7	82·1	126·5	...	☾ Last
6	·792	81·0	98·6	70·4	3 W S W	Cirr.	105·3	79·9	123·0	...	
7	·834	79·0	87·1	72·0	1 S W	Cum. Str.	102·9	77·2	121·5	...	
8	·861	82·0	92·2	72·2	0 S W	Clear	102·8	77·1	126·5	·589	
9	·852	85·5	91·4	71·5	3 S W	Clear	101·5	78·2	127·0	...	
10	·847	82·5	93·7	72·3	1 S W	Cir. Str.	102·0	77·7	130·0	...	
11	·832	82·0	94·8	70·7	0 W S W	Cirri	102·9	81·4	129·5	...	
12	·862	83·0	97·0	70·5	0 W	Cir. Str.	103·2	83·4	130·5	...	● New
13	·863	84·0	96·2	69·3	1 W	Cirri	103·1	81·5	134·5	...	
14	·827	82·5	93·7	68·0	5 W	Overct. Nimbi	101·9	82·8	121·0	...	
15	·803	83·0	95·5	69·7	2 W	Cir. Str.	103·3	82·5	131·0	...	
16	·842	83·0	95·3	67·5	1 W	Cir. Haze	101·9	80·3	126·0	...	
17	·8 2	81·5	94·6	69·9	1 S W	Clear	103·0	77·0	133·0	...	
18	·901	82·5	96·1	66·2	1 W S W	Clear	104·5	78·3	132·5	...	
19	·950	84·5	97·5	71·4	0 W	Clear	105·3	1·4	137·5	...	☽ First
20	·879	84·0	96·9	71·2	0 W	Clear	107·6	79·5	137·0	...	
21	·846	85·0	99·3	72·0	1 W	Cum. Str.	108·7	84·7	140·0	...	
22	·838	86·0	99·0	71·3	1 W	Cum. Str.	107·3	83·2	135·5	...	
23	·843	81·5	99·1	71·2	2 W by N	Lt. Cir. Str.	108·9	82·1	136·0	...	
24	·835	85·0	103·0	72·8	1 W	Clear	110·0	82·5	138·0	...	
25	·771	86·0	100·	74·2	0 S by W	Lt. Cirri	110·2	84·8	139·5	...	
26	·746	87·0	101·3	75·0	0 W	Cirri Str. H.	111·3	86·0	140·0	...	
27	·755	87·0	100·7	72·7	3 N E	St. Cirr.	110·2	85·3	136·0	...	○ Full
28	·786	86·0	101·3	73·2	0 W	Cum.Str. Haze	108·9	88·3	133·0	...	
29	·808	85·0	93·0	74·7	2 S W	Cum.	109·4	85·9	138·5	...	
30	·771	87·0	89·3	73·1	3 S W	Nimbi	108·9	85·0	137·0	·057	
31	·749	84·5	83·4	73·0	3 W S W	Cum.	105·9	82·1	130·0	·090	
eans.	28 830	84·2	96·6	71·3	.....	.....	106·0	81·6	131·6	·736	.....

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Hoshungabad Meteorological Observations, June, 1850.—Lat. 22° 41′ 9.″ N.—Long. 77° 53′ 45″ E.—Var. 1° 15′ E.—Dip. 24° 55′.

	Observations at Sunrise.						Maximum Pressure at 9h. 50m.						Observations at Apparent Noon.					
	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from Sunset to sunrise.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from Sunrise 9h. 50m.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 9h. 5m. to noon.	Aspect of Sky.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
	28·810	80·5	82·1	74·5	2 S W	Cir. Str.	28·865	85·0	89·8	79·5	2 S W	Cum.	28·726	85·5	97·0	77·3	3 W by N	Cum.
	·847	82·0	82·0	73·1	2 W S W	Lt. Cum.	*·876	84·0	88·5	78·6	3 W S W	Cum. Str.	·841	84·5	92·3	80·7	3 W	Cum. Str.
	·800	82·5	83·1	76·8	2 W	Overt. Cum.	·878	86·5	87·6	77·7	2 S W	Cum. Str.	·793	89·0	94·0	81·2	3 S W	Lt. Cir.
	·796	85·0	83·4	77·9	0 S W	Cum. Str.	·850	86·0	89·4	80·0	3 S W	Lt. Cirri	·797	87·0	93·8	81·8	3 W S W	Cirri St. Haze
	·747	93·0	83·1	74·5	2 W by S	Cum. Str.	·795	86·5	90·4	80·2	4 W S W	Clear	·720	86·5	95·5	81·8	4 W S W	Haze
	·750	85·5	86·6	76·9	3 S S W	Haze	·782	88·0	93·9	81·1	3 W by S	Lt. Haze	·710	89·0	96·2	80·3	4 W	Lt. Haze
	·772	85·0	87·1	76·8	2 W by S	Cir. Haze	·805	88·5	94·7	79·4	2 W S W	Clear	·733	89·5	101·1	76·4	2 W	Lt. Haze
	·755	86·0	87·7	76·8	1 W S W	Cum. Str.	·796	88·5	95·0	84·8	3 W	Cum. Str.	·386	89·0	102·4	79·6	3 W	Cumuli
	·720	88·0	88·3	76·7	1 W S W	Cum.	·762	88·5	94·8	79·6	3 W by S	Lt. Cum.	·671	89·5	101·3	80·1	3 W	Cum.
	·728	85·5	86·5	79·3	1 W	Cum. Str.	·756	88·0	92·7	79·4	4 W	Cum. Str.	·660	88·5	94·9	80·0	5 W by N	Cum. Lt.
	·712	82·5	84·4	78·3	1 W by S	Cum. Str.	·723	87·0	88·6	79·5	1 W	Lt. Cum.	·697	89·0	92·8	81·6	3 W	Cumuli
	·719	81·0	83·0	76·1	1 S W	Cum. Str.	·764	84·5	86·1	77·8	1 W	Lt. Cum.	·738	90·0	90·2	79·2	2 W S W	Lt. Cir. Str.
	·77[illegible]	86·0	85·1	79·4	1 W S W	Cum. Str.	*·796	88·0	92·4	80·1	2 S W	Cir. Cum.	·741	88·5	96·6	81·5	1 W by S	Cir. Cum.
	·7[illegible]	85·5	86·0	77·0	1 S W	Cum. Str.	·772	87·5	88·8	79·1	2 W	Cumuli	·728	88·0	90·8	79·2	1 W S W	Cum.
	·7[illegible]	83·0	83·4	76·7	2 W S W	Cum.	·815	85·0	86·8	78·2	3 S W	Cum. Str.	·780	86·0	92·6	80·3	2 S W	Cumuli
S.	·82[illegible]	83·5	83·2	77·0	1 W S W	Lt. Cum. Str.	·836	87·0	90·3	77·7	0 W	Lt. Cum. Str.	·755	87·5	96·0	80·1	2 S W	Lt. Cum.
	·81[illegible]	84·0	84·4	77·3	1 Variable	Lt. Cum. Str.	*·817	86·0	89·7	79·6	2 W	Lt. Haze	·770	87·5	97·2	81·6	3 W	Lt. Haze
	·76[illegible]	84·0	83·8	77·1	2 W S W	Cum. Str.	·826	87·0	89·6	78·4	3 W by S	Lt. Haze	·733	87·5	96·8	80·5	3 W	Lt. Haze
	·80[illegible]	83·5	83·3	76·3	2 S W	Cum.	·830	85·0	88·0	78·3	4 W S W	Dull Nimbi	·745	87·0	94·9	81·4	3 W by S	Dull Cum. Str.
	·762	82·5	82·5	76·3	0 W S W	Cum.	·798	85·0	87·3	78·7	1 W	Lt. Cum.	·741	85·5	94·4	80·2	3 W	Lt. Cum. St.
	·767	83·0	83·4	77·8	2 W S W	Overt. Nimbi.	·797	85·0	87·7	79·8	2 S W	Lt. Cum.	·748	85·5	91·6	80·0	3 W S W	Lt. Cum.
	·732	80·0	76·5	72·6	1 S W	Overt. Nimbi.	·777	80·0	79·9	74·7	2 S W	Overct. Nimbi	·736	82·0	83·3	77·5	3 S W	Lt. Nimbi
S.	·746	80·0	77·3	74·2	2 W	Overt. Lt. Nimbi.	·770	81·5	82·4	77·3	3 S W	Overct. Nimbi	·708	84·0	85·4	79·4	3 S W	St. Nimbi
	·751	79·0	77·9	73·3	2 W S W	Overt. Nimbi.	·778	78·0	79·0	74·7	1 S W	Fair & Lt. Nimbi	·731	81·0	81·9	76·6	2 S W	Fair & Lt. Nimbi
	·772	80·0	80·3	76·1	1 S W	Fair	·803	82·5	83·6	78·4	2 S W	Fair	·748	85·5	86·9	80·3	2 S W	St. Nimbi.
	·793	82·0	82·1	77·2	1 S W	Lt. Cum.	·812	84·5	85·4	78·3	2 S W	Clear	·785	87·0	88·0	79·4	3 S W	Cirri
	·770	83·0	82·9	77·0	1 S W	Lt. Cum.	·805	85·0	86·0	79·5	1 S W	Lt. Cirri	·729	88·0	89·8	81·0	2 S W	St. Cirri.
	·761	83·0	83·0	75·9	2 W	Cum. Strs.	·804	86·0	88·3	79·5	1 W S W	Cir. Cum.	·730	88·5	89·6	79·7	2 W	Cir. Cum. Haze
	·768	84·0	83·2	76·2	1 S W	Fair	·813	86·0	87·4	77·6	3 W by N	Cum. Str.	·772	88 0	89·8	77·4	3 W S W	Cum. Str.
S.	·749	82·0	82·3	74·2	2 S W	Fair	·806	86·0	87·0	78·1	2 S W	Cir. Str.	·713	88·0	89·9	78·3	2 S W	Fair
		83·1	83·2	76·3	.....	.....	28·803	85·5	88·3	78·8	.....	.....	28.738	87·0	92·9	79·8	.....	.....

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HOSHUNGABAD OBSERVATIONS.

Observations at 2h. 40m. P. M.						Minimum Pressure at 4 P. M.						Observation at Sunset.						Under N. Verandah.				
Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 2h. 40m.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 2h. 40m. to 4 P. M.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 4 P. M. to Sunset.	Aspect of Sky.	Maximum in Shade.	Minimum in Shade.	Per Black Bulb Registering Instrument Max. in Sun's rays.	Rain Gauge on Ground, registered at 6 A. M.	Phases of the Moon.
Inches.	°	°	°			28 Ins.	°	°	°			Inches	°	°	°			°	°	°	Inches.	
28·729	85·5	85·6	77·4	3 W by N	Overct. Nimbi	*·739	85·0	84·6	71·1	4 W S W	Dull Nimbi	28·758	84·5	83·9	74·1	4 W	Cum.	103·2	79·2	123·5	·828	
·726	85·5	97·9	82·8	2 W	Cum. Str.	·632	86·0	99·3	81·3	0 W	Cum. Str.	·780	86·5	90·8	75·3	2 Variabl	Overct. Nimbi	100·6	77·7	120·0	·031	
·743	88·0	98·2	82·0	2 W S W	Cirri	·692	87·5	100·2	82·2	1 W S W	Cir. Str.	·771	85·0	86·8	79·4	2 Variabl	Overct. Nimbi	101·2	80·7	119 5	...	☾ Last.
·716	88·0	98·5	83·2	4 W S W	Cir. Str. Haze	·650	88·0	99·7	83·0	4 W S W	Cir. Str. Haze	·703	87·5	90·9	76·2	2 S W	Cir. Str. Haze	101·2	80·5	114·5	·190	
·611	87·5	100·6	81·6	4 W S W	Haze	*·615	88·0	100·8	79·6	4 W by S	Haze	·638	87·5	97·3	78·4	1 W	Haze	102·7	77·4	112·0	·109	
·603	89·0	103·7	77·5	3 W by S	Cir. Lt. Haze	·600	89·0	104·0	77·9	3 W	Cir. Str. Haze	·613	89·0	99·6	74·2	4 N N E	Dull Haze	105·3	84·8	124·0	...	
·631	89·5	105·8	77·1	3 W by N	Cir. Lt. Haze	·608	90·0	105·2	77·5	2 W by S	Cir. Str. Haze	·685	89·5	91·3	77·0	2 S W	Nimbi	106·8	84·7	124·5	·031	
·634	90·0	105·0	77·7	4 W N W	Cum.	·589	90·0	104·8	77·3	4 W by N	Cum.	·641	90·0	101·3	75·9	1 W N W	Dull Cum.	106·6	85·4	124·5	·028	
·544	90·5	104·2	78·1	4 W N W	Cum.	*·573	90·0	99·6	77·3	6 E N E	Overct. Nimbi	·654	88·5	90·6	78·3	2 W N W	Dull Nimbi.	107·0	86·9	122·0	...	
·579	89·0	100·0	81·4	5 W by N	Cum. Str.	·582	90·0	99·2	80·1	6 W by N	Dull Overct.	·667	88·0	96·1	78·8	2 W	Dull Nimbi.	102·8	82·2	114·5	·020	● New.
·597	92·0	94·3	81·9	3 W	Nimbi	·590	90·0	97·9	78·6	2 W S W	Overcast	·671	82·5	84·2	78·0	2 S S W	Overct. Nimbi	97·9	82·4	116·5	·113	
·678	92·0	93·7	80·2	3 W S W	Cir. Str.	·617	92·0	93·8	80·4	1 W by S	Lt. Cirri	·703	91·5	91·3	79·2	0 W	Cir. Str.	98·0	76·9	114·0	·242	
·668	89·0	99·9	81·1	3 W S W	Cum. Str.	·600	90·0	100·2	81·9	2 W S W	Cum. Str.	·682	92·0	94·6	77·8	2 W by S	Cum. Str.	102·1	79·7	122·0	...	
·623	88·5	96·3	81·4	0 W	Cum. Str.	·601	89·0	97·1	78·6	0 W	Cum. Str.	·673	89·0	89·3	75·6	1 S W	Cum. Str.	98·4	83·6	115·5	...	
·744	86·0	82·3	75·5	2 W S W	Cum.	·708	86·5	86·9	77·8	5 E N E	Cum. Str.	·728	86·0	86·8	77·0	1 N E	Cum. Str.	98·2	80·2	112·0	...	
·720	87·0	97·1	79·4	1 W	Cum. Str.	·700	87·0	95·8	78·3	1 W	Cum. Str.	·751	87·5	90·2	75·3	2 W S W	Cum. Str.	99·1	79·5	117·0	·016	
·663	87·5	99·0	80·6	2 W	Dull Cum.	·628	87·5	98·3	78·0	2 W S W	Dull Cum. Str.	·740	86·5	87·7	77·0	3 E N E	Nimbi	101·2	81·6	120·5	·118	☽ First.
·675	87·5	99·2	79·6	2 W S W	Hazy Cum. Str.	·339	87·5	100·0	79·9	1 W	Haze Cum. Str.	·682	87·0	86·8	73·6	4 W by N	Dull Overct.	101·0	82·7	118·0	...	
·676	87·0	98·5	82·0	1 W S W	Hazy Cum.	·663	87·5	99·0	82·0	2 W	Haze Cum.	·740	84·5	85·1	77·9	4 W	Overct. Nimbi	100·3	80·9	118·0	...	
·673	86·0	96·3	81·6	2 W	Hazy Cum.	·330	86·5	96·8	81·9	2 W	Haze Cum.	·700	86·0	87·1	77·2	3 W	Overct. Nimbi	97·9	80·5	113·5	·429	
·636	86·0	92·3	80·0	3 W	Hazy Cum.	·627	86·5	92·3	81·1	3 W S W	Haze Cum.	·749	82·0	80·9	76·9	1 S W	Overct. Nimbi	94·3	81·2	109·0	·070	
·680	83·5	87·2	80·7	3 W	Lt. Cum.	·631	83·5	87·0	81·1	1 W by S	Haze Nimbi	·696	85·0	86·3	81·3	0 W	Cumuli	88·3	74·0	101·5	1·841	
·637	83·0	87·6	81·0	2 S W	Lt. Nimbi	·646	87·0	88·3	81·9	2 W	Mod. Clear	·701	86·0	86·9	79·1	1 W	Nimbi	84·3	73·7	103·0	·758	
·726	83·0	81·5	79·2	2 S W	Fair	·675	84·0	85·1	79·8	1 W S W	Fair	·713	84·5	85·0	78·8	1 W S W	Mod. Clear	85·2	72·0	...	1·266	○ Full.
·698	88·0	90·3	81·3	1 S W	Fair	·633	88·5	89·7	79·7	1 S W	Fair	·722	86·5	87·1	80·0	1 S W	Mod Clear.	90·6	78·1	105·5	·044	
·732	88·5	90·0	81·1	2 S W	Lt. Cir.	·711	89·0	90·1	80·6	2 S S W	Lt. Cirri	·726	88·0	88·1	79·4	2 S W	Lt. Cirri	91·4	79·3	109·9	...	
·687	91·0	91·9	81·2	3 S W	Str. Cum.	·684	91·5	91·9	81·4	1 S W	Lt. Cum.	·717	89·5	89·2	80·0	2 S W	Lt. Cum.	92·1	80·8	111·0	...	
·699	91·0	92·1	80·0	3 S W	Cirri Str.	·654	91·5	92·2	78·8	2 S S W	Lt. Cum.	·713	90·0	89·9	78·0	2 S W	Cum. Str.	93·8	80·3	111·0	...	
·683	90·0	92·2	77·8	3 W	Cum. Str.	·637	90·5	91·9	97·4	3 S W	Cum. Str.	·704	88·5	88·9	76·1	2 S W	Cum. Str.	93·9	81·0	109·0	...	
·700	90·5	93·1	77·3	1 W	Cirri	·663	88·0	94·2	79·4	1 W by S	Cirri	·716	89·0	90·0	77·4	1 W	Fair	94·8	79·8	110·0	...	
28·673	88·0	95·2	80·0	.....	.....	28·641	88·2	95·4	79·7	.....	.....	28·704	87·2	89·4	74·1	.....	.....	98·0	80·2	114·6	6·131	

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Hoshungabad Meteorological Observations, July, 1850.—*Lat.* 22° 41′ 9.″ *N.*—*Long.* 77° 53′ 45″ *E.*—*Var.* 1° 15′ *E.*—*Dip.* 24° 55′.

Observations at Sunrise.						Maximum Pressure at 9h. 50m.						Observations at Apparent Noon.					
Barometer unreduced.	Temperature.			Wind.	Aspect of Sky.	Barometer unreduced.	Temperature.			Wind.	Aspect of Sky.	Barometer unreduced.	Temperature.			Wind.	Aspect of Sky.
	Of the Mer.	External. Of Air.	External. W. Bulb.	Direction from Sunset to Sunrise.			Of the Mer.	External. Of Air.	External. W. Bulb.	Direction from Sunrise to 9h. 50m.			Of the Mer.	External. Of Air.	External. W. Bulb.	Direction from 9h. 50m. to noon.	
Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
28·7[illegible]	81·0	82·6	75·3	1 S W	Lt. Cirri	28·824	86·0	87·6	78·7	2 W S W	Lt. Cirri	28·793	89·5	90·9	80·4	2 W S W	Cum. Str.
·80[illegible]	83·5	83·9	78·0	2 W S W	Cir. Str.	·887	87·5	89·1	79·2	1 W by S	Cirri	·848	90·5	91·8	80·2	1 W S W	Cir. Str.
·918	84·0	84·1	78·2	0 W S W	Overct.	·958	86·5	88·0	78·7	0 S W	Cumuli	·922	88·0	90·6	80·4	1 W	Cum. Haze
·885	83·5	83·7	77·9	1 W	Nimbi	·944	85·5	86·5	78·4	1 S W	Cum. Str.	·877	89·0	90·7	81·0	0 W	Cum. Str.
·857	83·0	83·6	75·3	0 W S W	Cum. Haze	·897	86·5	88·1	77·6	3 S S W	Light Cum. Str.	·836	90·0	92·6	79·5	2 W	Cum. Str.
·886	84·0	83·8	74·2	0 W	Fair	·888	87·0	87·5	76·1	3 S W	Lt. Cir. Str.	·839	89·5	89·9	77·6	4 S W	Cumuli
·819	83·0	83·4	75·2	1 S W	Cir. Cum.	·874	86·0	87·[illegible]	7[illegible]·6	1 W S W	Lt. Cum.	·792	89·0	90·3	78·0	2 W S W	Cumuli
·881	83·0	83·1	78·4	0 W by S	Dark Nimbi	·879	85·5	86·7	80·0	0 S W	Cumuli	·816	88·5	91·4	80·9	0 S W	Cumuli
·8[illegible]	83·0	82·5	76·7	0 S W	Nimbi	·863	85·5	87·2	78·7	0 S W	Cum. Str.	·811	88·0	91·0	80·4	0 W	Cumuli
·8[illegible]	83·0	83·3	78·4	0 S S W	Fair	·836	86·0	87·8	78·8	0 W	Clear	·784	88·5	91·4	80·1	1 W	Cir. Str.
·8[illegible]	83·0	83·7	77·3	1 S W	Lt. Nimbi	·841	85·0	86·3	78·8	1 W by S	Lt. Cirri	·788	87·5	89·0	80·4	1 W S W	Cum. Haze.
·7[illegible]	85·0	85·1	77·3	0 S W	Haze Cirri	·826	8[illegible]	89·0	80·9	0 S W	Lt. Cirri	·781	90·5	92·2	82·4	1 S W	Cum. Haze
·7[illegible]	85·0	84·3	77·0	0 S W	Haze Cirri	·814	8[illegible]·5	87·7	79·4	0 S W	Cir. Haze	·732	89·5	92·8	82·2	0 S W	Cum. Haze
·7[illegible]	84·5	84·1	78·4	0 W by S	Overct.	·797	[illegible]·5	88·9	80·4	0 S W	Lt. Cirri	·770	89·6	90·9	82·2	0 S W	Cumuli
·7[illegible]	84·0	84·2	80·0	0 W	Overct. Cum.	·796	87·5	84·9	80·0	0 W	Overct. Cumuli	·749	85·5	86·0	80·4	0 W by S	Cumuli
·7[illegible]	80·0	80·9	77·1	0 S W	Overct. Nimbi	·7[illegible]	85·0	83·2	79·5	0 S W	Lt. Cum.	·728	84·0	85·8	81·6	0 W	Nimbi
·6[illegible]	83·0	81·8	78·2	0 W by S	Overct.	[illegible]	83·0	85·6	80·1	0 S W	Lt. Cum.	·716	86·0	89·0	81·8	0 W by S	Fair Lt. Cum.
·70[illegible]	82·5	82·3	78·9	0 W	Overct.	·759	84·0	84·9	80·3	0 W	Dark Cumuli	·658	85·0	85·7	80·6	0 W by N	Cumuli
·750	81·0	81·7	78·4	0 S S W	Dull Overct.	·746	83·5	81·0	78·3	0 S W	Overct. Nimbi	·758	80·0	82·0	78·9	0 S S W	Overct. Nimbi
·784	79·0	79·8	76·9	1 W by S	Overct. Nimbi	·794	79·5	82·1	78·5	0 S W	Overct. Nimbi	·772	80·0	81·4	78·5	0 S W	Overct. Nimbi
·731	80·0	80·6	77·4	1 S W	Overct. Nimbi	·815	80·5	82·4	78·4	1 S W	Lt. Nimbi	·703	83·5	85·3	80·6	2 W	Cumuli
·74[illegible]	79·0	79·4	76·6	1 W	Overct. Nimbi	·777	81·0	81·0	77·5	1 S W	Lt. Cum.	·739	82·5	83·5	78·3	2 S W	Lt. Cum.
·[illegible]	79·0	79·6	76·9	0 S W	Dull Nimbi	·776	80·0	80·7	78·4	1 S W	Lt. Nimbi	·606	82·0	84·0	81·0	1 S W	Fair & Lt. Cum.
·633	79·0	79·6	77·0	0 W by S	Dull Nimbi	·682	79·5	80·8	78·1	1 S W	Nimbi	·628	80·5	80·8	78·5	0 W	Nimbi
·552	79·0	79·9	77·6	0 W	Dull [illegible]bi	* ·651	80·0	81·3	79·6	0 S W	Nimbi	·538	80·5	81·9	79·3	2 S W	Nimbi
·623	77·5	77·7	74·3	2 S S W	O[illegible] Overct.	·568	80·0	78·7	76·3	2 S W	Nimbi	·616	78·0	79·9	77·7	2 S W	Nimbi
·718	78·5	78·4	76·0	0 S W	[illegible]verct. Nimbi	·660	77·5	82·2	78·5	1 S W	Fair Cir. Cum.	·737	81·5	83·0	78·3	2 S W	Nimbi
·90[illegible]	79·5	79·7	76·5	0	Nimbi	·754	80·0	83·4	79·2	1 S W	Fair Lt. Cum.	·842	82·5	84·9	79·0	2 S W	Cum. Str.
[illegible]	79·0	79·5	7[illegible]	[illegible] S W	Fair Cir. Cum.	·874	81·5	82·3	78·0	2 S W	Fair Lt. Cum.	·890	83·0	85·3	79·5	0 W	Cumuli
[illegible]	79·5	80·[illegible]	[illegible]·1	1 S W	Cumuli Strat	·936	80·5	83·2	78·1	1 S W	Fair Lt. Cum. Str.	·889	84·0	86·4	79·4	2 S W	Cum. Str.
[illegible]	81·0	[illegible]	77·0	0 S W	Cum. Str.	·941	82·5	83·2	77·7	1 W by S	Dull Cum. Str.	·838	82·0	82·3	78·4	0 W	Lt. Nimbi.
[illegible]	[illegible]	81·8	77·1	1 W S W	Dull Nimbi	·915	81·0	81·8	78·7	.....	.....	28·767	85·4	87·3	79·9	.....	.....
[illegible]	[illegible]	81·8	77·1	.....	.....	28·817	83·5	84·7	78·7	.....	.....						

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Days	Barometer reduced to 32°	Temperature of the Air	Temperature of the Air (External)	Temperature W. Bulb (External)	Wind Direction from 2h. 40m.	Aspect of Sky.	Minimum Pressure at 4 P. M. Barometer unreduced.	Temperature of the Mer.	Temperature of the Air (External)	Temperature W. Bulb (External)	Wind Direction from 2h. 40m. to 4 P. M.	Aspect of Sky.	Observations at 6 P. M. Barometer unreduced.	Temperature of the Mer.	Temperature of the Air (External)	Temperature W. Bulb (External)	Wind Direction from 4 P. M. to Sunset.	Aspect of Sky.	Verandah Maximum in Shade.	Verandah Minimum in Shade.	Per Register Instr. (Black Bulb) Max. in Sun's Rays	Rain Gauge on Ground, Registered at 6 A. M.	Phases of the Moon.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
1	28·722	93·0	92·9	79·5	2 S W	Cum. Str.	28·713	93·5	93·3	79·7	3 W S W	Cum. Str.	28·768	90·5	90·3	78·6	2 W S W	Cum. Str.	95·3	80·4	112·0	...	
2	·783	91·5	93·4	80·1	1 S W	Cumuli	·808	91·5	92·0	78·4	1 W	Cumuli	·852	86·5	86·1	79·0	1 E by N	Cumuli	94·5	80·8	116·0	...	☾ Last.
3	·868	91·0	91·8	80·3	0 W by S	Cumuli	·859	91·0	90·9	78·2	1 W	Dull Cum.	·900	87·0	86·0	82·1	0 W N W	Nimbi	93·4	81·7	115·5	·003	
4	·812	91·5	92·5	78·8	3 S W	Cum. Str.	·762	92·5	93·1	79·5	2 S W	Lt. Cum. Str.	·828	90·0	90·5	79·0	1 W	Lt. Cirri	93·9	81·5	112·5	·044	
5	·795	91·5	92·7	77·5	2 S W	Cum. Str.	·783	92·0	93·4	77·5	2 S W	Cum. Str.	·823	90·0	90·4	77·3	1 W S W	Lt. Cirri	95·8	81·5	114·5	...	
6	·802	90·0	92·1	77·8	4 S W	Cumuli	·790	90·5	92·2	77·4	2 S W	Cumuli	·820	89·5	90·1	77·0	1 S W	Cumuli	93·8	81·0	111·0	...	
7 S.	·758	92·0	93·1	78·2	1 S W	Cumuli	·741	92·0	93·8	78·5	1 S W	Cumuli	·788	89·5	90·0	76·0	1 W	Cirri	95·3	81·2	118·5	...	
8	·755	88·0	89·2	79·6	1 S W	Cumuli	·740	85·0	83·3	76·8	1 Variable	Nimbi	·816	86·0	85·7	81·3	0 S W	Nimbi	93·3	80·4	120·5	·326	
9	·736	87·0	88·2	81·4	0 W	Nimbi	*·748	85·0	86·5	78·8	1 W	Lt. Nimbi	·777	85·0	86·2	79·0	0 W	Nimbi Haze	91·8	79·0	114·5	·050	● New.
0	·720	90·0	95·3	81·9	0 W	Cumuli	·349	90·5	96.6	82·4	0 W	Cumuli	·712	90·0	92·3	81·7	0 N W	Cum. Str.	97·2	81·3	133·0	·300	
1	·704	90·0	91·7	81·7	0 S W	Cumuli	·683	91·0	91·2	81·3	2 S W	Hazy Cumuli	·762	89·0	89·1	80·9	1 W	Haze Cum.	93·6	81·1	122·5	...	
2	·372	93·0	94·3	82·2	0 S W	Hazy Cum.	·664	93·0	95·4	83·0	0 S W	Hazy Cum.	·730	92·0	91·6	80·2	0 S W	Haze	97·6	82·8	133·0	...	
3	·663	92·0	95·0	81·7	0 W by S	Hazy Cum.	·650	91·5	95·3	81·8	0 W by S	Hazy Cum.	·697	92·0	92·3	80·9	0 W	Cum. Haze	96·6	82·0	138·5	...	
4 S.	·696	92·5	94·3	81·9	0 W	Cumuli	·656	90·0	88·6	79·4	2 N E	Overct. Nimbi	·741	84·0	82·0	78·4	0 S W	Overct. Nimbi	95·1	80·3	130·0	...	
5	·710	85·5	86·4	81·5	0 W S W	Overct. Cum.	·707	86·0	85·9	81·6	2 E N E	Overct. Nimbi	·734	82·5	81·0	76·2	0 W	Overt. Cum.	86·8	80·3	...	1·285	
6	·635	84·5	86·8	82·5	0 E N E	Lt. Cum.	·504	85·0	87·4	82·3	0 E	L.Cu.Sunshine	·649	86·0	86·2	82·3	0 E N E	Fair & Cum.	88·3	77·7	...	·297	☽ First
7	·588	86·0	90·3	81·9	0 W by S	Lt. Cum.	·572	87·0	90·3	81·5	0 W N W	Cumuli	·634	85·0	85·3	80·1	0 N E	Cum.	90·9	80·3	134·0	·083	
8	·640	82·0	83·2	80·0	0 W	Nimbi	·627	82·0	83·4	79·6	0 W by S	Nimbi	·692	82·5	81·2	79·0	0 S W	Overcast.	86·6	79·6	...	·098	
9	·693	80·0	82·1	79·1	1 S W	Lt. Cum.	·672	81·0	82·9	79·8	0 S W	Fa. & Nim. Ha.	·632	82·0	83·4	80·0	0 S W	Cum.	84·3	77·5	...	·103	
0	·722	81·0	82·3	78·8	1 S W	Dull Lt. Nimbi	·686	81·5	82·5	79·4	1 S W	Nimbi	·741	82·5	82·2	79·3	0 S W	Cir. Cum.	82·8	76·8	...	·308	
1 S.	·370	85·5	86·7	80·8	2 S W	Fair Lt. Cum.	·657	85·0	85·9	80·1	3 S W	Lt. Cum.	·712	81·5	82·4	79·0	1 S W	Lt. Cum.	87·8	78·1	...	·073	
2	·643	84·0	85·8	80·1	3 W	Fair Lt. Cum.	·630	84·0	84·7	78·9	3 S W	Lt. Cum.	·708	81·0	82·6	76·4	3 W	Lt. Cum.	85·4	76·9	...	·220	
3	·578	81·5	83·4	79·5	3 W by S	Lt. Cum.	·563	81·0	81·4	78·3	2 S W	Lt. Cum.	·610	80·0	81·2	78·0	2 S W	Lt. Cum.	85·9	76·7	...	·044	
4	·542	82·5	83·4	79·4	0 W by S	Nimbi	·533	82·0	82·9	79·6	0 S W	Nimbi	·564	81·5	82·8	79·9	0 W	Cumuli	84·2	76·4	...	·092	○ Full.
5	·493	79·0	80·2	78·1	1 S W	Overct. Nimbi	·475	80·0	80·6	78·4	0 S S W	Overct.	·520	78·0	79·7	77·7	1 S S W	Overct. Nimbi	82·1	76·5	...	·711	
6	·602	78·0	79·6	76·8	4 S W	Nimbi	·596	78·5	79·3	76·7	1 S S W	Nimbi Overct.	·639	78·5	79·9	77·8	1 S W	Overct. Nimbi	80·9	74·2	...	1·762	
7	·712	81·0	81·9	78·4	2 S W	Nimbi	·676	81·0	82·3	79·2	0 S W	Nimbi	·732	81·0	82·1	79·1	1 S W	Lt. Cir. Cum.	85·7	75·5	...	·573	
8 S.	·798	84·0	86·8	80·2	3 S W	Cumuli	·773	84·5	87·1	80·5	1 S W	Cumuli	·846	84·0	85·0	80·3	0 S W	Cir. Cum.	88·5	77·4	119·5	·119	
9	·851	85·0	87·4	80·2	0 S W	Cumuli	·800	85·5	88·0	80·4	0 S W	Cum. Str.	·854	84·0	84·8	80·7	0 S W	Cum.	88·8	76·9	126·0	...	
0	·850	85·0	87·9	79·4	2 S W	Fair Lt. Cum.	·825	85·0	87·2	78·9	1 W S W	Lt. Cum.	·856	84·5	85·2	79·2	0 W	Cumuli	88·2	78·4	114·5	...	
1	·804	82·5	83·0	79·3	0 S W	Nimbi	·789	83·0	83·6	79·8	1 W S W	Lt. Nimbi	·827	80·5	83·0	78·7	0 W	Dull Cum.	84·0	78·9	.....	·051	
Means.	28·710	83·4	88·1	79·9	.....	.....	28·688	86·4	87·7	79·6	.....	.....	28·740	85·0	85·5	79·1	.....	.....	89·9	79·1	121·4	6·842	.....

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...al Meteorological Observations, August, 1850.—Lat. 22° 41′ 9″ N.—Long. 77° 53′ 45″ E.—Var. 1° 15′ E.—Dip. 24° 55′.

Observations at Sunrise.						Maximum Pressure at 9h. 50m.						Observations at Apparent Noon.					
Temperature.			Wind.			Temperature.			Wind.			Temperature.			Wind.		
	External.						External.						External.				
Of the Mer.	Of Air.	W. Bulb.	Direction from Sunset to Sunrise.	Aspect of Sky.	Barometer unreduced.	Of the Mer.	Of Air.	W. Bulb.	Direction from Sunrise to 9h. 50m.	Aspect of Sky.	Barometer unreduced.	Of the Mer.	Of Air.	W. Bulb.	Direction from 9h. 50m. to noon.	Aspect of Sky.
°	°	°			Inches.	°	°	°			Inches.	°	°	°		
79·0	80·1	77·4	1 S W	Dull Nimbi	28·883	81·5	82·4	79·3	1 S W	Dull Nimbi	28·866	84·0	85·5	79·7	1 W	Mod. Fair
79·5	79·8	76·2	1 W S W	Dull Nimbi	·893	81·0	82·4	78·6	1 S W	Lt. Cum.	·824	84·0	85·8	79·4	2 W S W	Lt. Cum.
80·0	80·0	76·3	1 S W	Overct. Nimbi	·780	80·0	80·3	76·8	1 S W	Nimbi	·727	80·0	80·4	77·4	1 W S W	Overct. Nimbi
77·5	77·4	74·4	3 W by S	Overct. Nimbi	·728	78·0	78·2	75·5	4 W S W	Lt. Nimbi	·708	78·5	79·2	76·6	4 W S W	Lt. Nimbi
77·5	77·0	75·0	2 S W	Overct. Nimbi	·763	78·5	78·9	76·3	4 S W	Nimbi	·752	80·0	81·2	77·6	4 S W	Lt. Cum.
77·0	77·5	74·4	2 S W	Overct. Nimbi	·834	79·0	79·6	76·2	2 S W	Lt. Cum. Str.	·818	80·5	82·1	77·8	2 W by S	Overct. Cumuli
77·5	77·7	75·2	1 S W	Overct. Nimbi	·875	78·5	78·9	76·0	1 W S W	Dull Cumuli	·836	79·5	78·8	76·9	1 S W	Cumuli
77·0	77·9	75·5	2 W S W	Overct. Nimbi	·848	77·0	77·8	75·9	1 W S W	Overct. Nimbi	·792	78·0	78·8	77·4	3 S W	Nimbi
77·5	77·7	74·8	1 S W	Overct. Cum.	·875	79·5	80·7	76·9	2 S W	Lt. Cum.	·833	80·5	81·7	77·4	3 S W	Lt. Cum.
78·0	78·6	75·7	1 S W	Dull Cumuli	·908	79·0	79·6	76·4	0 W	Hazy Cum.	·864	81·0	82·0	77·9	2 S W	Lt. Cum.
77·5	78·3	75·2	1 S W	Hazy Cum.	·913	80·0	80·5	76·3	0 W by S	Fair Lt. Cum.	·872	82·5	84·4	77·8	1 S W	Fair Lt. Cum.
77·0	78·3	74·5	0 S W	Fair	·949	80·5	82·4	77·2	1 W S W	Fair. Cir. Cum.	·911	82·5	84·6	77·2	2 S W	Fair Cir. Cum.
79·0	79·3	75·5	0 S W	Fair Cir. Cum.	·967	81·5	82·4	76·4	1 W by S	Fair Cumuli	·944	82·0	84·1	76·7	2 S W	Fair Cir. Cum.
79·0	79·4	75·8	0 S W	Dull Cum.	·958	81·0	82·8	77·3	2 S W	Fair Cum.	·914	84·0	85·8	78·4	1 W S W	Fair Cir. Cum.
79·0	79·4	75·3	0 W S W	Lt. Cum.	·977	79·5	80·5	76·0	1 S W	Cumuli	·925	82·5	84·9	78·6	1 W S W	Cumuli
78·5	78·8	74·9	0 S W	Cum.	·944	80·0	81·2	76·4	0 S W	Cumuli	·900	83·0	84·6	77·8	1 S W	Cum.
80·0	80·0	75·2	1 S W	Dull Cum.	·962	81·0	81·8	76·3	0 S W	Cumuli	·933	83·0	85·1	77·8	0 S W	Fair and Cum.
80·5	80·1	76·4	0 W by S	Fair Cum.	·988	83·0	85·5	78·3	1 W S W	Fair	·940	85·0	88·7	79·4	0 W	Fair
80·0	80·4	76·3	0 S W	Dull Cum.	·959	82·5	84·3	79·4	0 W S W	Fair and Lt. Cum.	·908	85·0	87·0	80·4	0 S W	Fair and Lt. Cum.
80·0	79·3	77·2	0 W	Foggy	·937	82·5	83·8	80·4	1 W by N	Fair and Lt. Cum.	·850	83·0	85·5	78·8	0 S W	Dull Cumuli
79·0	79·3	76·4	0 W	Fair and Cum.	·912	82·5	84·7	79·1	0 W	Fair and Lt. Cum.	·877	85·0	87·8	80·1	1 E S E	Fair and Cum.
79·0	80·6	77·2	0 S	Overct.	·933	78·5	80·6	77·6	0 S	Overct.	·909	82·0	83·3	78·4	3 S W	Fair and Dark Cum.
77·5	79·8	76·5	0 S W	Overct.	·984	80·0	81·0	77·5	0 S W	Overct.	·944	82·0	83·2	78·6	1 S W	Cumuli
78·5	79·8	76·8	0 W by S	Overct.	·952	80·0	79·8	76·6	0 S W	Overct.	·916	79·5	80·6	77·9	0 W S W	Dull Overct.
79·5	78·2	75·4	0 S W	Overct. Nimbi	·922	78·5	79·3	76·8	0 W by S	Overct.	·841	81·5	83·5	78·6	0 W	Fair Cum.
90	78·1	75·5	0 S W	Fair Cum.	·921	78·5	79·1	76·4	0 W S W	Fair and Cum.	·867	80·0	81·4	78·0	0 W	Fair Cum.
9·5	79·5	76·9	0 W S W	Overct. Cum.	·952	80·0	80·2	78·0	0 W S W	Nimbi Overct.	·878	82·0	84·5	81·4	0 S W	Fair Cum.
9·0	78·6	75·8	0 S W	Fair Cum.	·968	80·0	80·3	76·3	0 S W	Nimbi Overct.	·900	82·0	82·9	77·4	0 S W	Fair Cumuli
82·0	78·7	75·8	0 S W	Overct.	·951	78·5	79·7	76·6	1 S W	Nimbi Overct.	·911	79·0	80·1	77·0	1 S W	Overct. Nimbi
	77·6	74·4	1 W S W	Overct. Nimbi	·950	77·5	78·4	74·8	1 S W	Nimbi Overct.	·914	79·5	80·3	76·2	2 S W	Lt. Cum.
	78·2	75·6	0 W	Overct. Nimbi	·968	79·5	81·1	76.7	1 S W	Fair Cum.	·858	82·0	83·0	78·6	2 W S W	Lt. Cum.
1·5	8·8	75·7	.....	.....	28·914	79·9	80·9	77·0	.....	.....	28·867	81·6	83·2	78·1		

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HOSHUNGABAD OBSERVATIONS.

Days of the M.	Observations. Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 2h.40m.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 2h. 40m. to 4 P. M.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 4 P. M. to Sunset.	Aspect of Sky.	Verandah. Maximum in Shade.	Verandah. Minimum in Shade.	Per Black Bulb Registering Instrumen Max. in Sun's Rays	Rain Gauge on Ground, registered at 6 A. M.	Phases of the Moon
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
1	28·774	93·0	88·4	80·4	2 W S W	Mod. Clear	28·763	85·5	88·3	80·2	0 W	Mod. Clear	28·822	82·5	83·9	79·4	1 W S W	Dark Cum.	89·9	75·6	115·0	·368	
2	·731	91·5	87·3	79·6	1 S W	Fair Lt. Cum.	·714	85·0	85·8	79·3	1 S W	Mod. Clear	·747	83·0	83·9	79·8	0 S W	Lt. Cum. Str.	81·1	77·6	...	·361	
3	·711	90·0	80·0	76·9	1 W S W	Overct Nimbi	·696	78·0	79·1	76·3	1 W S W	Overct. Nimbi	·712	77·5	79·1	76·2	0 W S W	Overct. Nimbi	80·8	75·0	...	·029	
4 S.	·648	91·0	80·0	76·6	4 S W	Overct. Nimbi	* ·656	79·5	80.2	76·9	4 S W	Lt. Cumuli	·718	78 5	78·9	74·2	4 S W	Cum.	81·0	74·1	...	2·853	
5	·676	92·0	83·4	79·1	4 S W	Cumuli	* ·680	81·0	80·6	77·9	3 W S W	Nimbi	·715	79·0	79·1	74·6	2 S W	Cum.	84·4	73·7	...	·310	
6	·757	80·5	79·7	77·3	2 W S W	Nimbi	·701	78·5	78·1	76·0	2 S W	Overct. Nimbi	·780	78·0	77·2	75·2	2 S W	Overct. Nimbi	81·8	74·5	...	·188	
7	·776	81·0	81·3	77·7	1 S W	Cumul	·757	81·0	81·4	78·1	0 W S W	Cumuli	·792	80·5	81·0	78·4	0 W	Cum.	81·6	75·4	...	1·443	
8	·753	80·0	81·1	78·0	2 S W	Cumuli	·728	80·0	80·4	78·0	1 W S W	Overct. Cum.	·772	79·0	79·8	76·9	0 S W	Cum.	83·8	76·2	...	·258	● New.
9	·790	81·0	82·3	78·4	2 W S W	Fair Lt. Cum.	·777	81·0	82·6	79·4	1 W S W	Cumuli	·821	80·0	80·8	77·8	1 S W	Overct. Cumuli	83·7	77·4	...	·050	
10	·808	82·5	82·9	77·7	2 W S W	Lt. Cum.	·792	82·5	83·8	78·0	0 W S W	Fair Lt. Cum.	·848	81·0	81·3	77·4	0 W S W	Lt. Cum.	84·4	77·5	...	·037	
11 S.	·823	84·0	85·6	76·4	2 S W	Fair Lt. Cum.	·802	84·5	85·5	77·1	2 W by S	Lt. Cum.	·859	82·0	81·7	77·0	1 W S W	Lt. Cum.	87·0	77·3	123·0	...	
12	·864	84·0	86·9	77·8	1 W S W	Fair Lt. Cum.	·846	85·0	86·0	77·1	3 W S W	Lt. Cir. Cum.	·872	82·5	82·3	76·2	1 S W	Lt. Cir. Cum.	87·7	77·5	121·0	...	
13	·881	83·0	85·3	77·2	1 W S W	Fair Lt. Cum.	·861	83·5	85·9	77·0	2 W by S	Fair Cir. Cum.	·867	82·5	83·4	77·6	0 W S W	Cir. Cum.	88·9	78·6	121·5	...	
14	·848	85·0	87·4	78·4	2 S W	Fair	* ·843	85·5	86·6	77·7	1 W S W	Fair Cum. Str.	·878	83·5	84·2	78·1	0 S W	Cir. Cum.	88·8	78·7	121·5	...	☽ First.
15	·873	84·5	85·1	77·2	2 S W	Cum.	·840	85·0	85·4	76·9	2 S W	Lt. Cumuli	·877	82·5	83·0	76·2	0 S W	Cum. Str.	87·7	78·7	...	...	
16	·848	85·0	85·3	76·6	1 W S W	Cum.	·831	85·0	85·8	76·2	1 S W	Lt. Cum.	·866	83·0	83·7	76·4	0 S W	Cum. Str.	88·2	78·1	...	...	
17	·864	84·5	86·4	78·5	0 S W	Fair and Cum.	·832	85·0	87·6	78·4	0 W	Fair and Cum.	·888	83·0	84·6	79·2	0 W	Diffused Cum.	88·8	79·3	122·5	...	
18 S.	·877	86·0	89·6	79·9	0 W	Fair	·851	86·0	85·3	76·1	0 W	Dull Cumuli	·910	83·0	84·0	77·7	1 S W	Dull Cum.	91·1	79·7	132·5	...	
19	·851	82·5	83·2	79·6	0 S W	Dull Cum.	·834	80 5	82·7	79·1	1 S W	F.& Hzy. Cum.	·887	82·0	81·4	78·0	0 S W	Dull Cum.	88·3	79·8	136·0	·132	
20	·792	85·0	87·0	81·3	0 S W	Cumuli	·765	85·0	86·3	78·7	0 E	F. & Dk. Cum	·822	82·5	82·7	79·5	0 W	Dull Cum.	88·4	78·8	126·0	1·021	
21	·847	85·0	87·9	79·8	0 E S E	Fair and Cum.	·808	85·5	87·7	78·4	1 S E	Fair and Cum.	·950	84·0	84·8	77·4	1 S E	Fair Cum.	89·5	77·9	126·5	·040	
22	·853	83·0	85·1	80·0	2 S W	Fair and Cum.	·841	83·5	85·9	80·1	1 S W	F. & Dk. Cum.	·896	80·5	82·1	78·5	1 S W	Overct.	86·9	78·9	...	...	
23	·863	83·0	85·3	79·4	0 W by S	Cum.	·845	82·5	83·7	79·0	0 W S W	Cumuli	·914	81·5	82·1	77·9	2 S W	Cum.	85·2	78·5	...	1·701	○ Full.
24	·866	79·5	79·9	77·4	0 W by S	Overct. Nimbi	·843	79·0	80·0	77·8	0 W by S	Overct. Nimbi	·877	78·0	78·5	76·3	0 S W	Overct. Nimbi	·81·2	78·5	...	·155	
25 S.	·768	82·6	82·9	78·8	1 W by S	Overct Nimbi	* ·773	79·0	79·3	76·2	1 Variable	Overct. Nimbi	·831	77·5	79·1	76·1	1 W by S	Overct. Nimbi	84·9	76·7	...	·888	
26	·761	82·5	83·3	79·1	0 S	Fair Cum.	* ·769	83·0	84·7	80·1	1 S by W	Fair	·846	83·0	82·5	78·8	1 W by S	Fair Cum.	85·3	77·2	...	1·842	
27	·834	85·0	86·4	80·6	1 S W	Fair Cum.	·820	84·5	85·4	80·6	2 S W	Fair Cum.	·855	80·0	81·0	76·4	1 W S W	Dark Cum.	·87·2	78·4	132·0	...	
28	·843	84·0	84·8	78·9	1 S W	Fair Cum.	·816	84·0	85·0	79·1	1 S W	Fair and Cum	·856	82·0	81·6	76·6	1 S W	Fair Cum.	86·7	77·6	122·0	...	
29	·836	81·0	81·6	77·9	2 S W	Fair Cum.	·805	81·0	81·8	77·4	3 S W	F. & Lt. Cum	·872	80·0	79·2	76·1	1 S W	Overct. Nimbi	82·3	77·6	...	·080	
30	·828	79·5	80·1	76·7	1 W	Overct. Nimbi	·812	80·0	80·9	77·0	1 S W	Lt. Cum.	·862	79·0	80·0	76·7	0 W S W	Lt. Cum.	81·7	76·5	...	·271	☾ Last.
31	·833	83·0	83·9	79·1	3 W S W	Lt. Cum.	·833	83·0	83·9	79·1	3 W S W	Fair and Cum.	·884	81·5	81·2	78·5	1 S W	Lt. Cum.	84·0	76·7	...	·010	
Means.	28·809	82·7	84·8	78·4	.....	.....	28·791	82·6	83·7	78·0	.....	.....	28·841	81·0	81 3	77·2	.....	.....	85·5	77·3	124·9	12·037	.....

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...yabad Meteorological Observations, September, 1850.—*Lat.* 22° 41′ 9″ *N.*—*Long.* 77° 53′ 45″ *E.*—*Var.* 1° 15′ *E.*—*Dip.* 24° ·55′.

Observations at Sunrise.						Maximum Pressure at 9h. 50m.						Observations at Apparent Noon.					
	Temperature.			Wind.			Temperature.			Wind.			Temperature.			Wind.	
		External.					External.						External.				
Barometer unreduced.	Of the Mer.	Of Air	W. Bulb.	Direction from Sunset to sunrise.	Aspect of Sky.	Barometer unreduced.	Of the Mer.	Of Air.	W. Bulb.	Direction from Sunrise to 9h. 50m.	Aspect of Sky.	Barometer unreduced.	Of the Mer.	Of Air.	W. Bulb.	Direction from 9h. 5m. to noon.	Aspect of Sky.
Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
28·932	77·5	77·7	74·8	1 W	Overct. Nimbi.	28·994	80·0	80·9	77·5	0 W by S	Fair Lt. Cum.	28·953	79·5	79·9	77·0	0 W S W	Overcast.
·876	78·0	78·6	76·2	1 W	Overct. Nimbi.	·948	79·5	80·8	77·7	0 W S W	Lt. Cum.	·910	81·0	83·2	78·9	0 E N E	Dark Cum.
·891	79·5	78·5	76·4	0 W	Overct. Nimbi.	·939	81·0	82·7	79·0	0 W by S	Cumuli	·888	82·0	84·3	79·9	0 W	Fair Cum.
·932	79·5	79·7	77·3	0 W by S	Overct.	·989	81·0	81·4	78·3	0 S W	Fair & Cumuli	·948	83·5	84·4	80·1	0 W	Fair Cum.
·966	80·5	80·6	77·9	0 W	Cum. Hazy	29·017	81·0	80·6	76·9	0 W	Hazy Cum.	·967	83·0	84·2	79·6	0 W	Fair Cum.
·947	80·5	80·5	77·2	0 W	Cum.	28·996	80·5	81·4	78·5	0 S W	Overct. Nimbi	·968	81·0	81·7	78·4	0 W	Overct. Nimbi
·896	79·5	79·5	76·4	0 W	Cum.	·920	80·5	80·6	76·9	0 W	Cum.	·868	81·5	82·8	78·3	0 W	Overct. Nimbi
·863	79·5	79·9	76·7	0 W by S	Overct.	·880	79·5	80·3	76·9	1 S S W	Diffused Cum.	·825	81·0	81·6	77·8	2 S W	Overct. Nimbi
·859	79·0	78·8	76·2	1 W	Overct. Nimbi	·896	81·0	81·4	77·2	0 S W	Fair Nimbi	·855	82·5	84·3	79·3	0 W	Fair Hazy Cum.
·858	78·5	78·1	75·0	1 W	Overct. Nimbi	·897	78·0	79·2	76·6	2 W S W	Lt. Nimbi	·858	80·0	80·9	78·4	1 W S W	Cumuli
·902	78·0	77·9	74·9	0 W	Dull Nimbi	·958	79·0	79·6	76·5	1 S W	Lt. Nimbi	·916	80·0	80·7	76·9	2 S W	Lt. Cum.
·917	78·0	78·1	75·0	0 W	Fair	·964	79·0	78·9	74·6	0 W	Cumuli	·914	81·0	83·3	77·8	1 W	Lt. Cum.
·883	77·5	77·9	74·2	1 W	Cum. Fair	·937	78·0	79·0	74·8	2 W S W	Hazy Cum.	·867	80·0	81·2	76·3	2 W by S	Fair & Cum.
·913	78·0	76·1	72·6	1 W	Cum.	·952	78·0	78·9	74·2	1 W	Fair Cum.	·912	81·0	81·7	76·4	1 W by N	Fair Lt. Cumuli
·982	77·0	76·9	72·8	0 W	Fair & Cum.	29·015	79·0	79·5	73·6	1 W S W	Fair Lt. Cum.	·951	81·5	82·6	76·3	0 W	Lt. Cum.
29·023	76·5	76·6	72·8	0 W	Cirri Fair	·063	79·0	79·8	74·3	0 W	Lt. Cirri	·988	82·5	83·8	76·0	1 W S W	Cir. Haze
28·972	78·0	77·8	73·3	1 S W	Cirri	·012	80·0	81·4	75·9	1 W	Clear	·936	82·5	84·3	76·7	0 W by S	Clear
·9[illegible]	78·0	77·6	72·9	1 W S W	Cirri	28·977	80·0	80·7	74·5	1 W S W	Clear	·917	82·5	84·2	77·3	0 W S W	Clear
·923	78·0	77·9	73·7	0 S W	Lt. Cirri	·973	80·0	81·7	75·4	1 W	Clear	·942	82·5	84·3	76·6	1 S W	Clear
·982	80·0	78·7	74·6	0 S W	Lt. Cirri	29·026	82·0	83·5	77·4	1 W	Clear	976	84·0	86·4	79·3	0 W	Cumuli
·[illegible]	81·0	79·4	75·2	0 W	Cirri	·020	82·5	84·1	78·4	1 E S E	Cumuli	·950	87·0	86·7	79·8	1 W	Cum.
·[illegible]08	80·0	78·8	74·9	0 W S W	Cum.	·017	82·0	83·4	77·4	0 S W	Fair & Cum.	·934	84·0	86·0	79·7	0 E S E	Diffused Cum.
·[illegible]44	80·0	78·5	75·1	0 W by S	Cir. Str.	28·980	81·5	82·8	78·3	0 S W	Fair Cumuli	·923	83·5	86·0	79·6	0 W	Haze Cum.
·[illegible]71	80·0	79·0	75·2	1 Variable	Fair Cum.	29·003	81·5	82·4	77·6	0 N	Fair white Cum.	·966	83·0	85·3	78·9	0 E	Haze Cum.
·[illegible]7	79·0	78·3	74·5	0 S W	Fair Cir. Str.	·032	81·0	81·7	77·0	0 W	Fair Cum.	·977	83·0	84·7	79·0	0 S by W	Dark Haze Cum.
·[illegible]	79·0	77·8	74·2	0 W S W	Fair Cir. Str.	·013	81·0	82·4	76·2	0 S W	Lt. Cirri	·969	83·5	85·8	78·3	2 N E	Lt. Cirri
·[illegible]0	79·0	76·9	72·6	1 W	Overct. Nimbi	28·996	80·5	80·7	75·4	1 W N W	Overct. Cum.	·922	82·0	82·7	76·6	3 W	Lt. Nimbi
·[illegible]9	79·0	78·4	74·6	1 S W	Overt. Cum.	29·004	80·0	80·7	76·0	1 S W	Nimbi	·943	82·5	83·4	76·3	3 S W	Fair & Nimbi
·[illegible]3	79·0	78·5	74·4	0 W S W	Cir. Hazy	·051	80·9	81·4	77·3	1 S W	Lt. Nimbi	29·027	82·5	83·9	77·4	1 W	Cir. Haze
·[illegible]8	80·0	79·0	74·9	0 S W	Cirri	·070	81·5	83·1	77·9	1 S W	Clear	·005	83·5	84·6	78·3	0 W S W	Fair & Cumuli
·[illegible]11	78·6	78·4	74·8	.....	.....	28·984	80·2	81·1	76·6	.....	.....	28·932	82·2	83·6	78·0	.....	.....

Days of the Month	Barometer reduced.	Observations at 2h. 40m. P. M. Temperature. Of the Mer.	External. Of Air.	External. W. Bulb.	Wind. Direction from 2h. 40m.	Aspect of Sky.	Minimum Pressure at 4 P. M. Barometer unreduced.	Temperature. Of the Mer.	External. Of Air.	External. W. Bulb.	Wind. Direction from 2h 40m. to 4 P. M.	Aspect of Sky.	Observations at Sunset. Barometer unreduced.	Temperature. Of the Mer.	External. Of Air.	External. W. Bulb.	Wind. Direction from 4 P. M. to Sunset.	Aspect of Sky.	Under N. Verandah. Maximum in Shade.	Minimum in Shade.	Per Black Bulb Registering Instr. Max. in Sun's Rays	Rain Gauge on Ground Registered at 6 A. M.	Phases of the Moon.
		°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
1 S.	·865	79·5	80·6	77·7	1 W S W	Overct. Nimbi	28·851	80·0	80·7	77·9	1 W S W	Overct. Nimbi	28·898	79·5	80·7	78·2	1 W by S	Dull Dif. Cum.	82·0	76·8	...	·958	
2	·800	83·0	86·2	81·6	1 E S E	Fair Cum.	·780	82·0	83·3	79·3	0 W	Fair Cum.	·841	81·5	82·1	78·7	0 W by S	Fair & Cumuli	86·3	77·8	...	·008	
3	·8[illegible]	82·5	83·4	79·8	0 S W	Nimbi	·825	81·5	82·5	79·7	0 W	Cumuli	·870	81·5	82·3	80·4	0 W S W	Cum.	87·0	77·1	132·5	·006	
4	·90[illegible]	85·5	86·5	80·0	0 W by S	Fair Cum.	·865	86·0	88·0	80·0	0 W	Fair Cumuli	·897	85·0	85·7	79·6	0 S W	Cum.	88·3	78·8	134·0	·196	
5	·921	83·5	84·6	78·4	0 W	Hazy Cum.	·907	83·0	83·4	78·4	2 S W	Overct. Cum.	·932	82·0	82·4	79·1	0 W	Fair Cum.	86·2	79·7	...	...	
6	·899	81·5	82·2	79·5	0 W	Overct. Nimbi	·880	82·0	82·4	79·3	0 W	Overct. Nimbi	·923	81·0	82·1	79·4	0 W	Dull Cum.	83·1	79·8	...	·451	● New
7	·786	83·5	85·0	79·3	0 W	Cum.	·763	84·0	86·3	80·1	0 W	Dull Cum.	·811	83·5	83·7	79·0	0 W	Cum.	86·8	78·5	...	...	
8 S.	·77[illegible]	83 0	84·7	79·3	2 S W	Lt. Cum.	·751	84·0	85·3	79·6	2 W by S	Fr. & Diff. Cm.	·809	81·0	80·3	76·4	2 N E	Dull Cum.	86·1	78·6	...	...	
9	·756	85·0	87·7	80·2	2 W N W	Fair Cum.	·751	84·0	85·5	79 2	2 W by N	Diff. Cum.	·814	79·5	79·4	76·5	3 E N E	Overcast	88·1	77·3	...	·242	
10	·785	82·5	83·1	80·2	2 W S W	Hazy Cum.	·773	82·0	82·4	79·5	2 W S W	Overct. Nimbi	·836	79·5	80·1	77·4	1 S	Ovt. Dark Nm.	84·2	75·7	...	2·252	
11	·858	81·5	82·7	78·3	2 S W	Lt. Cum.	·836	82·0	82·4	77·9	1 W by S	Lt. Nimbi	·873	81·0	81·3	77·6	0 W by S	Cirro Cum.	83·9	76·9	...	·331	
12	·841	82·5	84·9	74·4	3 S W	Fair & Cum.	·837	82·5	84·6	76·7	3 W	Fair & Cumuli	·872	80·5	81·3	76·4	0 W	Cum.	84·7	77·1	120·5	...	
13	·812	80·5	81·4	75·0	1 W	Fair Cum.	·800	81·5	82·4	76·6	1 W	Fair	·841	80·0	80·4	75·6	1 W S W	Dark Cum.	83·2	76·4	...	·062	☽ First
14	·867	83·0	84·1	77·4	1 W	Fair Lt. Cum.	·846	84·0	85·6	77·8	0 W	Fair Cumuli	·880	81·0	81·5	75·8	1 W	Hazy Cum.	86·0	75·7	118·0	·006	
15 S.	·926	82·5	83·3	76·5	0 W	Lt. Cum.	·912	82·5	82·6	75·7	0 W	Hazy Cum.	·962	81·0	81·4	76·6	0 W	Hazy Cum.	84·4	75·8	...	...	
16	·937	84·0	85·9	77·2	1 W S W	Cirri	* ·933	84·0	86·3	77·2	1 W by S	Cirri	·965	82·5	83·1	76·3	0 W	Cirri	86·7	75·9	115·5	...	
17	·875	84·5	86·8	77·8	0 W	Lt. Cum.	·858	84·5	87·2	77·4	0 W	Cumuli	·906	83·0	83·3	78·1	0 W	Cir. Str.	87·7	77·2	119·0	...	
18	·861	84·5	86·8	77·4	1 W	Clear	* ·851	85·0	87·8	78·4	0 W	Clear	·890	83·0	83·9	78·4	0 W	Cirri	87·9	76·8	122·0	...	
19	·868	84·5	86·3	76·3	1 W S W	Cl. & Lt. Cum.	* ·863	85·0	87·5	77·9	0 W	Lt. Cum.	·916	83·5	84·6	78 0	0 W	Cirri	87·7	77·0	125·0	...	
20	·925	86·0	88·7	79·9	0 W	Clear Cum.	·894	86·0	88·8	79·7	0 W	Cumuli	·943	84·5	85·6	79·5	0 W	Cum.	89·3	77·9	127·0	...	
21	·876	86·0	88·9	79·4	0 W	Cum.	·860	86·5	89·0	79·7	1 W	Cumuli	·904	82·0	83·0	78·7	1 Variable	Overcast	89·5	78.6	122·5	...	○ Full
22 S.	·854	85·5	86·8	76·4	1 E N E	Diffd. Cum.	·831	83·5	84·1	78·9	2 Variable	Overct. Cum.	·877	82·0	82·5	78·8	0 W	Overcast	88·3	77·6	122·0	·317	
23	·856	84·0	87·2	78·5	0 W S W	Dark Cum.	·843	84·5	86·3	79·6	1 E by S	Dark Cum.	·892	82·0	82·[illegible]	77·6	0 W by S	Dark Cum.	87·8	77·7	130·0	·236	
24	·850	85·5	87·6	79·9	2 W	Heav. Dk. Cm.	* ·837	80·0	81·0	75·4	2 Variable	Overct. Nimbi	·888	80·0	80·5	76·4	0 W by S	Cumuli	87·6	74·4	130·5	·173	
25	·891	84·5	85·6	74·8	1 Variable	Dark Cum.	·858	81·0	81·8	76·2	1 W	Fair Cum.	·942	80·5	80·8	76·7	0 W	Fr. Bright Cm.	86·9	76·8	132·0	·193	
26	·884	85·0	86·5	76·4	3 N	Cum.	·849	84·5	86·2	76·4	2 N by E	Fair Cum.	·930	83·5	84·6	76·5	2 W N W	Cum.	87·6	75·5	131·5	·633	
27	·854	82·0	83·2	77·3	3 W by S	Nimbi	·835	82·5	83·2	76·8	3 W	Dull Nimbi	·916	80·5	79·9	75·7	1 W	Nimbi	84·7	76·3	...	...	
28	·893	81·0	84·8	76·5	3 S W	Fair Cum.	·856	84·0	86·4	78·1	1 S W	Cumuli	·915	82·5	83·4	77·7	1 W S W	Cir. Str.	86·5	77·8	115·5	·162	
29 S.	·928	84·0	86·2	77·6	1 S W	Fair Cum.	·904	85.0	86·4	77·6	0 S W	Cumuli	·973	82·0	82·6	77·1	1 Variable	Cir. Haze	87·1	77·8	124·0	...	☾ Last
30	·930	85·0	87·9	78·6	1 W S W	Fair Dk. Cum.	·918	85·5	87·7	78·6	1 S W	Fair & Cumuli	·980	83·0	83·2	76·7	2 S by E	Overcast	88·2	78·4	132·0	...	
Means.	28·864	83·6	85·3	78·1	.....	.....	28·845	83·4	84·9	78·1	.....	.....	28 896	81·7	82·2	77·6	.....	.....	86·4	77·2	125·2	5·626	.....

HOSHUNGABAD OBSERVATIONS.

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Hoshungabad. Meteorological Observations, October, 1850.—Lat. 22° 41′ 9″ N.—Long. 77° 53′ 45″ E.—Var. 1° 15′ E.—Dip. 24° 55′.

Days of month.	Observations at Sunrise. Barometer unreduced.	Temperature. Of the Mer.	External. Of Air.	External. W. Bulb.	Wind. Direction from Sunset to Sunrise.	Aspect of Sky.	Maximum Pressure at 9h. 50m. Barometer unreduced.	Temperature. Of the Mer.	External. Of Air.	External. W. Bulb.	Wind. Direction from Sunrise to 9h. 50m.	Aspect of Sky.	Observations at Apparent Noon. Barometer unreduced.	Temperature. Of the Mer.	External. Of Air.	External. W. Bulb.	Wind. Direction from 9h. 50m. to noon.	Aspect of Sky.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
	29·041	79·0	78·1	74·7	0 E	Lt Cirri	29·101	82·0	82·3	77·6	1 W by S	Hazy Cirri	29·012	84·0	85·5	77·8	2 W S W	Fair Lt. Cum.
	29·076	79·0	77·3	74·2	0 E by S	Lt. Cir.	29·115	81·0	81·6	76·6	1 S W	Clear and Cirri	29·071	83·0	83·5	77·4	1 W S W	Cir. Haze
	29·037	80·0	79·0	75·1	0 S W	Lt. Cir.	29·096	83·0	83·7	77·8	1 W by S	Clear	29·003	84·0	84·5	77·2	1 W	Cum.
	29·036	80·0	77·1	74·4	0 E N E	Cir. Str.	29·105	81·0	81·2	76·7	1 N E	Cir. Haze	29·034	83·0	83·4	77·6	1 E by S	Hazy Cum.
	29·080	80·0	77·9	74·8	0 W	Cir. Haze	29·110	80·5	80·6	77·0	1 W	Dull Cir. Haze	29·058	83·0	85·2	77·5	1 W	Fair & White Cum.
S.	29·073	80·0	78·8	75·1	1 N E	Cirri	29·105	82·0	82·2	76·4	0 W	Clear	29·020	84·5	86·9	77·4	0 W by N	Fair and Cum.
	29·051	80·0	78·4	74·6	0 E N E	Clear	29·085	82·5	83·0	77·2	1 N by E	Clear	29·023	84·5	86·2	77·2	0 W	Clear
	29·030	80·0	78·6	74·5	0 N E	Clear	29·062	83·0	83·4	77·1	1 N E	Clear	29·008	86·0	88·0	77·8	2 W by N	Clear
	29·027	80·5	79·7	74·8	0 E N E	Clear	29·053	83·0	83·3	76·4	1 N E	Clear	...	...	Fever.	Fever.	.....	.....
	29·102	83·0	82·9	74·3	1 W	Clear	29·102	83·0	82·9	74·3	1 W	Clear	...	...	Fever.	Fever.	.....	.....
	...	...	Fever.	Fever.	.....	.....	29·132	83·0	82·4	74·2	1 E by N	Clear	29·086	84·0	86·0	74·5	1 E N E	Clear
	...	...	Fever.	Fever.	.....	.....	29·158	81·0	82·0	73·2	1 N E	Clear	29·085	82·5	82·6	73·3	1 E by N	Clear
S.	29·081	78·0	72·4	67·0	1 E	Clear	29·124	82·0	82·7	71·3	1 N E	Clear	29·068	83·5	85·6	71·5	1 N E	Clear
	29·100	78·5	69·2	63·8	1 E	Clear	29·137	81·0	80·3	69·7	1 E N E	Clear	29·081	82·0	84·9	71·5	1 E	Clear
	29·077	79·0	71·4	66·2	1 E by N	Clear	29·116	81·5	81·8	70·7	1 E	Clear	29·012	84·0	85·7	71·1	2 N E	Clear
	28·999	77·5	70·6	64·7	1 E	Clear	29·037	80·0	79·0	69·0	1 E	Lt. Cir.	28·988	82·5	85·4	70·9	1 N W	Cirri
	28·981	76·0	69·7	61·9	1 E	Clear	29·051	79·0	78·9	69·0	1 N E	Clear	29·010	82·0	85·4	70·5	1 W by N	Clear
	29·062	78·0	70·4	63·2	0 E N E	Cir. Str.	29·108	79·5	79·7	69·4	1 N E	Lt. Cum.	29·041	84·0	85·2	70·1	1 N E	Clear
	29·103	74·5	70·1	65·3	0 E	Cirri	29·169	80·0	79·7	68·8	1 N E	Clear	29·124	82·0	83·4	69·3	2 E N E	Clear
S.	29·128	75·0	66·3	60·0	1 N E	Clear	29·172	78·9	77·5	65·1	2 E N E	Clear	29·112	82·0	82·3	63·0	2 E N E	Clear
	29·133	75·0	67·3	58·2	0 N E	Cirri	29·165	77·0	76·3	62·4	1 E by N	Lt. Cirri	29·106	81·5	81·4	62·7	3 N E	Clear
	29·148	75·0	68·4	60·3	1 E	Lt. Cirri	29·195	78·0	77·3	65·5	3 E N E	Clear	29·135	82·0	82·3	69·8	3 E N E	Clear
	29·128	78·5	75·2	71·1	1 E by N	Cir. Str.	29·164	79·5	79·4	73·6	2 N E	Cum.	29·086	81·0	82·0	75·2	0 E	Dull Cum.
	29·052	79·0	73·4	71·2	1 N E	Cir. Str	29·105	79·5	79·4	74·9	1 N E	Clear	29·027	83·0	84·2	77·0	1 E N E	Fair and Cum.
	29·047	79·5	75·2	73·0	2 E	Dull Diffd. Cum.	29·062	80·0	78·9	75·6	2 E by N	Cirri	28·996	82·5	82·1	77·8	0 E N E	Overct. Cum.
	29·026	79·5	77·1	74·1	1 E N E	Nimbi	29·082	80·0	78·5	75·6	0 E	Overct. Nimbi	28·980	80·0	80·7	75·2	1 N E	Overct. Nimbi
7 S.	29·003	79·5	77·2	74·0	1 N E	Overct. Dif. Cum.	29·046	80·0	79·7	76·3	1 E N E	Fair Cum.	29·002	81·0	81·5	76·8	1 N E	Fair Cum.
8	28·950	79·5	76·4	73·8	0 E N E	Overct. Cir. Cum.	29·028	80·5	80·2	76·3	1 N E	Overct. Diff. Cum.	28·981	82·5	82·2	77·1	0 E	Fair & Dark Cum.
9	29·017	78·0	76·3	73·4	0 E	Cirri	29·077	80·5	80·4	75·0	1 E N E	Cir. Cum.	29·022	82·0	82·6	75·3	1 E N E	Fair and Cum.
0	29·026	77·0	72·3	65·4	1 E N E	Cirri	29·112	79·0	77·8	70·4	1 E N E	Lt. Cirri	29·000	81·0	81·4	71·6	1 E N E	Fair
1	29·080	76·5	73·4	68·3	0 E by N	Cir. Cum.	29·139	79·5	78·9	69·9	1 N E	Cirri	29·085	82·5	84·3	70·4	1 W	Lt. Cirri
Mean.	29·058	78·4	74·4	69·8	.....	.....	29·106	80·6	80·5	73·0	.....	.....	29·044	82·7	84·0	73·6	.....	.....

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HOSHUNGABAD OBSERVATIONS.

Days of the Month.	Observations at 2h. 40m. P. M. Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 2h. 40m.	Aspect of Sky.	Minimum Pressure at 4 P. M. Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 2h. 40m. to 4 P. M.	Aspect of Sky.	Observation at Sunset. Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 4 P. M. to Sunset.	Aspect of Sky.	Under N. Verandah. Maximum in Shade.	Under N. Verandah. Minimum in Shade.	Per Black Bulb Registering Instrument Max. in Sun's Rays.	Rain Gauge on Ground, registered at 6 A. M.	Phases of the Moon.
	Inches.	°	°	°			Inches.	°	°	°			Inches	°	°	°			°	°	°	Inches.	
1	28·966	84·0	84·6	76·9	1 W	Dark Cumuli	28·956	80·0	81·0	77·1	2 S S W	Overct. Cum.	29·016	81·0	81·0	76·7	0 S W	Dull Cum.	87·1	78·1	121·0	...	
2	·960	84·5	86·5	76·7	0 W by S	Fair and Cum.	*9·63	84·5	85·8	77·8	0 S W	Cir. Haze	·010	83·0	84·4	77·6	0 W	Dull Cum.	87·9	74·7	128·0	·033	
3	·945	85·5	88·1	79·6	0 W S W	Dark Cum.	·940	84·0	84·3	77·4	1 Variable	Overct. Cum.	·000	83·0	82·8	78·4	0 W	Heavy Cum.	88·0	77·7	121·5	...	
4	·981	82·5	83·8	78·4	1 Variable	Dark Cum.	·963	83·0	83·1	78·2	1 S W	Dull Cum.	·969	81·5	81·8	77·9	0 W	Dull Cum.	87·8	75·8	...	·035	
5	·979	84·0	86·8	77·2	1 W	Fair Cum.	·972	84·5	86·9	77·2	3 W N W	Cumuli	·006	82·0	82·0	76·8	0 W	Diffd. Cum.	87·9	75·7	130·5	...	
6 S.	·972	85·5	86·3	75·8	2 N W	Fair Cum.	·966	86·0	86·6	75·0	2 N W	Cumuli	28·974	83·0	83·9	76·8	0 W	Fair Cum.	88·3	77·8	133·0	...	● New.
7	·952	86·0	88·2	75·7	1 N E	Clear	·926	86·5	87·4	75·5	2 N E	Clear	·952	84·0	84·6	77·7	0 W	Cirri	88·8	76·1	132·0	...	
8	...	...	Fe-	ver.	.....	.....	·924	89·0	90·3	76·7	2 N E	Cumuli	...	Fe-	ver.	...	.....	Clear	91·4	75·4	127·0	...	
9	...	...	Fe-	ver.	.....	.....	·922	88·5	90·8	75·9	2 W	Clear	·943	84·0	84·7	72·1	0 W	Clear	90·7	74·8	127·0	...	
10	...	..	Fe-	ver.	.....	.....	·993	86·5	88·3	77·4	0 W	Diffd. Cum.	29·007	84·0	84·8	71·8	0 W	Cirri	90·4	75·8	128·5	...	
11	29·035	85·0	87·1	72·3	1 N by E	Clear	29·020	84·0	86·9	70·6	0 N E	Clear	·052	83·5	83·8	73·6	0 N E	Cirri	89·2	72·8	130·0	...	
12	·028	83·0	87·5	71·6	1 N E	Clear	·003	83·0	86·9	71·8	1 N E	Clear	·030	83·5	84·0	72·5	0 N E	Clear	89·4	70·9	130·0	...	
13 S.	·012	85·0	89·0	70·4	0 N	Clear	·001	85·0	86·8	69·0	1 N E	Clear	·034	82·0	82·3	72·1	0 N E	Clear	89·0	70·6	132·0	...	☽ First.
14	28·996	84·5	87·7	67·9	3 N	Clear	28·963	85·0	86·9	68·5	1 N E	Clear	·019	83·0	84·8	68·0	1 E	Clear	88·9	69·2	128·0	...	
15	·981	86·0	87·4	67·2	4 N	Clear	·956	86·5	87·2	68·1	2 N E	Clear	·000	82·0	82·1	71·4	1 N E	Clear	89·1	71·5	129·0	...	
16	·934	84·0	87·2	67·5	2 N E	Clear	·924	85·0	89·1	68·9	2 N E	Clear	28·939	82·0	82·8	70·7	1 N E	Clear	89·0	69·9	131·5	...	
17	·944	84·0	87·9	68·0	1 W S W	Clear	·928	84·0	88·4	70·2	0 W	Clear	·952	80·5	81·7	70·6	0 W	Lt. Cir.	89·1	67·8	132·0	...	
18	·999	83·5	85·4	70·0	2 N W	Lt. Cum.	·983	84·0	84·6	69·7	0 E by N	Cum.	·988	81·0	81·2	70·8	1 E by N	Cir. Cum.	87·4	67·7	125·5	...	
19	29·063	83·5	85·3	68·2	1 E N E	Cum.	29·040	84·0	84·4	69·5	1 N E	Lt. Cum.	29·056	81·0	81·3	69·9	0 N E	Cir. Str.	86·8	69·4	125·0	...	
20 S.	·068	83·0	84·8	64·1	3 N E	Clear	·048	82·0	83·6	63·4	3 N E	Clear	·062	79·0	79·5	66·5	1 N by E	Clear	85·7	64·9	116·0	...	
21	·066	82·5	82·9	64·0	3 N E	Clear	·044	82·0	83·2	63·8	2 N E	Clear	·057	80·0	79·8	66·1	1 N E	Clear	85·1	65·0	114·0	...	○ Full.
22	·055	83·0	83·3	70·9	3 E N E	Fair and Cum.	·027	84·0	84·1	70·7	3 N E	Cumuli	·084	81·0	80·8	71·5	2 E	Cir. Cum.	86·2	65·6	119·0	...	
23	·032	82·0	83·3	76·5	1 W	Dull Cum.	* ·045	82·5	83·7	76·7	0 W by S	Overct. Cum.	·059	80·5	79·8	76·1	0 W	Dull Cir. Cum.	85·6	72·3	...	...	
24	28·928	83·0	85·1	76·3	2 N E	Cum.	*28930	84·0	84·8	75·9	1 N E	Fair and Cum.	28·947	81·5	80·9	77·3	2 E	Dull Cum.	86·9	71·3	127·5	·024	
25	·933	84·0	84·0	76·5	4 N E	Cum.	* ·931	83·5	82·9	76·4	3 N E	Fair and Cum.	·948	82·0	81·7	77·2	0 E	Overct. Cum.	84·8	73·1	...	1·073	
26	·921	80·5	80·1	75·8	1 E N E	Overct. Cum	·896	81·0	80·3	76·3	1 E N E	Cumuli	·929	80·0	80·2	76·9	1 N E	Fair and Cum.	80·7	75·0	...	·230	
27 S.	·894	82·5	83·3	76·9	2 N E	Fair and Cum.	* ·917	83·0	83·4	76·5	0 N E	F.& Dark Cum.	·954	82·0	81·6	77·1	0 E	Dull Cum.	84·4	73·9	...	·258	
28	·894	81·0	81·0	77·3	0 E	Overct. Nimbi	* ·908	82·0	81·7	78·4	0 E	Dull Cum.	·945	81·5	81·1	77·9	0 E	Dull Diff Cum.	83·0	74·8	...	...	☾ Last.
29	·943	83·5	83·4	74·2	1 E	Fair Cum	* ·940	83·5	83·2	73·9	1 E	Fair and Cum.	·977	81·5	81·1	74·3	0 E	Lt. Cirri	85·1	75·3	120·0	·190	
30	·976	82·5	83·0	68·1	1 E by N	Clear	·963	82·5	82·6	67·4	1 E by N	Clear	29·003	80·0	80·4	72·1	0 E N E	Col. Cirri	84·6	70·4	127·5	...	
31	29·040	84·5	87·4	71·5	2 W	Cirri	29·034	84·0	87·2	72·5	1 W	Lt. Cir. Str.	·047	83·5	84·1	73·2	1 W by N	Clear	87·4	71·2	127·5	...	
Means.	28·982	83·6	85·3	72·7	.....	.....	28·968	84·0	85·3	73·1	.....	.....	28·998	81·8	82·1	73·7	.....	.....	87·2	72·4	126·5	1·813	

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bad Meteorological Observations, November, 1850.—*Lat.* 22° 41′ 9.″ *N.*—*Long.* 77° 53′ 45″ *E.*—*Var.* 1° 15′ *E.*—*Dip.* 24° 55′.

Observations at Sunrise.						Maximum Pressure at 9h. 50m.						Observations at Apparent Noon.					
Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from Sunset to Sunrise.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from Sunrise to 9h. 50m.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 9h. 50m. to noon.	Aspect of Sky.
Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
29·[illegible]	75·0	74·6	70·1	1 W by S	Lt. Cir.	29·138	80·0	80·5	72·1	1 W S W	Clear	29·084	83·5	85·2	75·5	1 W S W	Lt. Cum.
·0[illegible]	77·5	75·8	72·2	1 W S W	Clear	·133	80·5	81·9	76·1	1 W S W	Clear	·070	83·5	84·8	75·2	0 W by S	Clear
S. ·[illegible]	77·5	73·9	67·6	1 E	Clear	·162	80·5	79·8	69·7	2 N E	Clear	·064	83·5	84·6	72·3	1 N E	Clear
·[illegible]	74·0	69·9	61·8	1 E N E	Clear	·144	78·0	76·8	66·3	2 E	Clear	·080	81·5	82·0	68·6	1 E N E	Clear
·0[illegible]2	75·0	71·2	63·9	0 W S W	Cir. Cum.	·122	77·0	75·6	65·7	1 E	Dull Cumuli	·103	76·5	75·8	66·6	0 E	Dull Diffused Cum.
·0[illegible]7	70·5	67·0	62·6	1 W	Clear	·155	75·0	74·2	65·7	2 E N E	Clear	·086	78·0	77·8	66·4	2 E	Clear
·1[illegible]3	73·5	69·4	63·5	1 E	Clear	·207	76·5	76·3	67·4	1 E N E	Clear	·152	79·5	79·2	67·2	3 N by E	Clear
·[illegible]8	70·0	66·3	60·2	1 E	Clear	·232	75·5	75·4	65·6	2 E by N	Clear	·159	78·5	78·3	65·7	3 E N E	Clear
·1[illegible]	72·0	67·1	61·0	1 E	Clear	* ·196	76·0	74·6	65·5	2 E N E	Clear	·086	78·5	78·4	66·8	4 N E	Clear
S. ·0[illegible]0	73·5	70·2	65·3	0 E	Cir. Haze	·120	77·5	76·6	69·8	3 E	Cirrous Haze	·047	79·5	79·9	70·6	4 E	Scattered Cum.
·0[illegible]1	73·0	70·5	66·2	0 S	Cir. Str.	·061	78·5	78·7	71·9	2 E	Clear	28·987	80·0	81·4	70·9	3 N E	Scattered Cum.
28·[illegible]2	* 67·5	65·8	62·0	1 E	Clear	·015	74·0	73·6	64·6	0 S E	Clear	·916	78·0	78·9	63·4	1 N E	Clear
29·[illegible]3	66·5	63·5	56·4	0 W	Clear	·092	72·5	72·0	60·7	1 W S W	Clear	29·042	74·5	75·6	62·2	1 W by S	Clear
·[illegible]4	65·0	61·9	56·6	1 E N E	Clear	·163	71·0	70·1	59·2	1 W	Clear	·088	74·5	77·6	62·4	1 W	Clear
·[illegible]6	64·5	62·6	56·8	1 W by S	Clear	·178	70·5	68·9	60·8	0 S W	Clear	·148	74·0	75·7	62·0	1 W	Clear
·[illegible]8	66·0	62·2	56·1	2 E	Clear	·194	71·5	70·3	60·2	2 E by N	Clear	·151	75·0	76·0	62·3	1 E N E	Clear
·[illegible]4	67·0	63·7	55·4	1 E	Clear	·209	71·0	69·2	58·7	1 E	Clear	·164	74·5	75·3	62·4	2 E	Clear
·[illegible]1	65·0	63·4	57·9	1 E	Clear	·184	71·5	70·4	61·2	0 N E	Clear	·132	74·0	76·0	61·1	1 W S W	Clear
·[illegible]4	63·5	59·2	54·8	1 N E	Clear	·198	71·5	67·8	59·4	1 E N E	Clear	·160	75·0	76·8	62·3	1 W	Clear
·[illegible]1	63·5	62·9	56·0	1 W	Clear	* ·180	70·0	69·7	59·0	1 W	Clear	·153	75·5	76·3	61·6	1 S W	Clear
·[illegible]1	62·5	61·2	54·9	1 S W	Clear	·246	71·0	70·3	59·6	1 S W	Clear	·208	75·0	76·1	61·7	1 W S W	Clear
·[illegible]2	65·0	61·6	56·6	1 W	Clear	·299	71·0	70·1	60·9	1 W	Clear	·258	74·0	75·2	62·3	1 W	Clear
·207	66·5	63·5	57·5	1 E	Clear	·272	72·0	70·3	61·7	1 E	Clear	·219	76·0	76·7	63·2	1 W	Clear
S. ·[illegible]8	67·0	63·5	57·6	1 N E	Clear	·276	71·5	69·9	61·0	2 N E	Clear	·208	75·0	77·4	63·1	1 N	Clear
·210	67·5	65·2	60·4	1 E	Cirri	* ·246	72·5	71·8	62·6	1 E	Cirri	·196	75·5	77·5	64·7	1 W	Cirri
·[illegible]07	66·0	62·6	57·4	W by S	Clear	·259	72·0	71·4	62·5	2 S E	Clear	·211	75·0	76·3	64·0	1 W	Clear
·[illegible]25	66·5	63·1	55·4	2 W	Clear	·276	70·0	67·9	54·8	4 E N E	Clear	·246	72·0	70·7	56·4	4 N E	Clear
·[illegible]45	61·5	60·0	55·5	1 E	Clear	* ·311	70·0	68·5	57·9	3 E N E	Clear	...	...	Fever.	Fever.	.....	.....
·[illegible]51	64·0	59·7	54·1	1 E N E	Clear	·318	69·0	66·4	54·0	4 E N E	Clear	...	...	Fever.	Fever.	.....	.....
·[illegible]33	64·0	60·2	53·8	1 E N E	Clear	·314	69·0	67·2	55·9	4 E N E	Clear	·252	72·0	72·0	58·1	4 E N E	Clear
						29·[illegible]	73·6	72·5	[illegible]	.....	.....	29·131	76·8	77·4	64·9	.....	.....

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Days of the Month	Observations at 2h. 40m. P. M.						Minimum Pressure at 4 P. M.						Observations at Sunset.						Under N. Verandah.				Phases of the Moon.
	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 2h. 40m.	Aspect of Sky	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind Direction from 2h. 40m. to 4 P. M.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 4 P. M. to Sunset.	Aspect of Sky.	Maximum in Shade.	Minimum in Shade.	Per Register Instr. (Black Bulb) Max. in Sun's Rays.	Rain Gauge on Ground, Registered at 6 A. M.	
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
1	29·009	85·0	86·8	76·0	0 W S W	Cum.	29·001	83·5	85·4	77·3	0 W	Heavy Cum.	29·026	82·5	82·9	76·4	0 W	Dull Cumuli	87·1	71·8	...	...	
2	·016	85·0	86·6	74·2	2 N	Cum.	28·996	85·0	86·0	73·3	1 N E	Lt. Cir. Cum.	·018	82·5	82·8	76·5	1 N E	Lt. Cum.	88·4	74·6	115·0	...	
3 S.	·033	84·5	84·6	74·3	1 E N E	Clear	*29·031	85·0	83·9	69·8	1 N E	Clear	·061	82·0	81·6	71·2	1 N E	Clear	86·8	72·2	111·5	...	
4	·001	83·0	84·1	66·2	1 E N E	Clear	28·979	83·0	83·8	66·4	1 N E	Clear	28·996	80·0	80·2	69·1	1 N E	Clear	85·3	67·3	112·0	...	● New.
5	·043	77·0	77·2	68·0	0 E	Dull Diffd Cm.	29·022	78·0	76·9	68·3	0 E	Fr. & Cir. Cm.	29·046	76·0	75·0	68·2	0 E	Cir. Cum.	77·2	68·5	...	...	
6	·040	80·0	80·0	67·9	3 E N E	Clear	·031	80·0	79·7	66·4	1 N E	Clear	·061	77·5	77·6	67·6	0 N E	Clear	82·3	63·6	112·5	...	
7	·112	80·5	80·4	66·3	2 N E	Scattered Cm.	·108	80·0	79·4	66·6	2 N E	Scattered Cum.	·145	78·0	76·8	66·7	1 N E	Clear	82·7	66·8	114·5	...	
8	·121	79·0	79·9	65·8	3 E N E	Clear	·100	80·0	79·3	64·8	3 N E	Clear	·125	77·0	76·2	66·0	1 N E	Clear	81·2	63·9	109·0	...	
9	·040	79·5	79·8	66·7	4 E	Clear	·021	80·0	79·9	68·0	3 E N E	Cum.	·059	80·0	77·4	68·4	0 N E	Cum.	81·9	64·5	109·0	...	
10 S.	28·981	80·5	81·1	71·2	4 E N E	Dull Cum.	28·969	80·5	80·9	71·3	2 E N E	Dull Cumuli	·010	79·0	79·1	72·3	1 E N E	Overct. Cum.	82·4	69·1	112·0	...	
11	·912	82·0	82·8	70·1	3 N E	Heavy Cum.	·888	82·0	82·7	69·4	2 N	Lt. Cum.	·921	79·5	79·4	68·7	0 N E	Clear	84·2	69·3	117·5	...	
12	·843	76·5	83·3	62·8	2 W	Lt. Cum.	*29·831	78·0	82·8	61·9	3 W	Clear	28·902	76·0	77·6	64·2	1 W	Clear	83·9	64·9	118·0	...	☽ First
13	·974	75·0	82·6	64·3	0 W	Clear	28·968	76·0	83·2	63·2	1 W	Clear	29·021	75·5	78·5	65·0	0 W	Clear	83·8	60·6	114·5	...	
14	29·046	73·5	80·2	60·8	1 W	Clear	29·039	73·5	81·4	62·7	1 S W	Clear	·080	75·0	76·6	62·5	0 W S W	Clear	82·6	60·7	117·0	...	
15	·075	73·0	79·5	61·8	1 W	Clear	·060	73·0	79·4	62·9	1 S by W	Clear	·088	74·0	75·9	64·0	0 S W	Clear	81·4	60·3	118·0	...	
16	·089	73·0	78·8	61·6	1 N N E	Clear	·072	73·0	78·1	61·9	1 E N E	Clear	·097	74·0	75·5	63·9	0 E N E	Clear	80·8	57·4	116·5	...	
17 S.	·093	73·0	77·8	61·8	1 E	Clear	* ·057	73·0	77·6	62·7	1 E N E	Clear	·103	74·0	74·5	63·2	0 E	Clear	79·9	59·9	115·5	...	
18	·083	75·0	80·5	61·9	2 N E	Clear	...	...	On	duty.	.....	.....	...	...	On	duty.	.....	.....	81·3	60·9	115·0	...	
19	·096	76·0	80·3	60·5	1 W	Clear	·070	76·0	80·0	61·5	0 W S W	Clear	·086	73·5	75·7	62·6	1 W	Clear	80·8	57·6	116·0	...	○ Full.
20	·104	77·0	80·1	62·3	1 W S W	Clear	* ·100	78·5	79·8	62·3	1 S W	Clear	·133	74·5	75·1	62·4	1 W S W	Clear	80·6	59·3	113·0	...	
21	·161	77·0	80·0	62·8	1 W S W	Clear	* ·156	78·5	80·0	62·9	2 S	Clear	·188	76·0	75·4	63·1	1 S W	Clear	80·5	57·4	116·0	...	
22	·286	76·0	78·6	63·6	0 E	Clear	·170	76·5	78·2	63·4	1 E	Clear	·191	75·5	75·5	63·4	1 E	Clear	80·6	59·7	117·5	...	
23	·160	77·0	79·4	64·3	1 N E	Clear	·152	78·5	80·5	64·9	1 S W	Clear	·172	75·5	76·0	65·3	0 S W	Clear	80·8	59·3	115·0	...	
24 S.	·149	77·0	80·9	64·4	1 W	Clear	·127	77·0	80·4	64·3	1 W	Clear	·164	75·0	75·7	64·6	0 W	Clear	80·5	60·2	112·0	...	
25	·139	77·5	78·8	63·3	1 W by S	Cir. Haze	·130	78·0	79·8	64·7	1 W by S	Cirri	·148	77·0	77·1	65·1	0 W S W	Cirri	79·7	62·4	111·5	...	
26	·154	77·5	79·5	63·6	2 W	Clear	·134	78·5	79·5	64·1	1 W S W	Clear	·157	77·5	76·4	65·0	0 W	Clear	79·9	61·0	114·0	...	☾ Last.
27	·178	74·5	74·4	60·2	3 E N E	Clear	·158	74·5	73·7	61·8	1 N E	Clear	·178	72·5	72·1	62·3	0 E N E	Clear	75·7	60·1	98·0	...	
28	...	...	Fe-	ver.	.....	.....	...	...	Fe-	ver.	.....	.....	...	...	Fe-	ver.	.....	.....	76·5	56·2	106·5	...	
29	...	...	Fe-	ver.	.....	.....	...	...	Fe-	ver.	.....	.....	...	...	Fe-	ver.	.....	.....	75·4	55·4	102·5	...	•
30	·208	72·0	74·6	59·1	3 E N E	Clear	·192	72·0	74·1	58·9	2 E	Clear	·219	70·0	71·6	59·8	0 E	Clear	76·2	53·1	99·0	...	
Means.	29·076	77·7	80·4	65·2	.....	.....	29·058	78·2	80·2	65·3	.....	.....	29·088	76·6	76·9	66·2	.....	.....	81·3	62·6	112·4	...	.....

Bal Meteorological Observations, December, 1850.—Lat. 22° 41′ 9″ N.—Long. 77° 53′ 45″ E.—Var. 1° 15′ E.—Dip. 24° 55′.

Observations at Sunrise.						Maximum Pressure at 9h. 50m.						Observations at Apparent Noon.					
Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from Sunset to Sunrise.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from Sunrise to 9h. 50m.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 9h. 50m. to noon.	Aspect of Sky.
Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
29·258	63·0	53·3	47·8	2 E	Clear	29·297	67·0	66·1	56·4	3 E N E	Cirri	29·246	70·5	70·5	57·6	2 N E	Cir. Haze
·195	65·0	61·5	53·6	1 E	Cirri	·266	67·5	65·8	55·7	2 N E	Cir. Str.	·219	71·5	72·6	58·9	3 E	Cir. Str.
·164	68·5	63·4	56·9	0 E	Dull Cum.	·196	68·5	66·9	56·4	1 E	Overct. Cumu.	·150	72·0	71·8	60·3	2 E	Dull Cum.
·201	69·0	66·3	60·5	1 E	Dull Cum.	·236	71·0	70·0	61·6	1 E S E	Cumuli	·198	74·0	75·2	65·4	1 E	Fair and Cum.
·222	66·5	65·2	60·0	1 S W	Clear	·269	71·0	70·7	63·6	1 W S W	Clear	·221	75·5	75·8	65·5	1 W S W	Clear
·225	68·0	63·4	59·8	1 E N E	Cirri	·282	72·0	70·2	62·7	1 E N E	Cirri	·244	74·5	74·7	65·0	1 E N E	Cirri
·212	68·5	61·7	56·8	1 E	Cirri	·260	71·5	69·4	60·4	2 E by N	Clear	·200	74·5	74·8	63·9	1 E N E	Clear
·181	69·0	63·2	57·7	1 E	Clear	·223	72·0	68·7	60·1	1 N E	Clear	·164	75·0	76·7	65·1	1 W S W	Clear
·201	68·0	62·9	57·4	1 E	Clear	·245	73·0	70·4	62·6	1 E N E	Clear	·194	76·5	76·7	65·5	1 W S W	Clear
·168	69·0	65·3	60·8	1 S	Clear	·237	73·0	71·1	63·2	1 E	Clear	·197	77·0	76·8	64·9	2 W S W	Clear
·178	68·5	63·4	60·0	1 W	Clear	·238	73·0	70·9	62·8	1 W	Clear	·187	76·0	75·4	64·3	1 E	Clear
·177	66·0	63·0	57·1	1 E	Clear	·240	72·0	70·3	57·7	2 E N E	Clear	·169	74·0	72·7	58·2	2 E	Clear
·182	65·0	58·3	53·9	1 E	Clear	·237	69·0	66·3	56·1	2 E	Clear	·178	72·0	72·6	57·5	1 S W	Clear
·188	64·5	60·4	53·6	1 E	Clear	·263	68·0	66·2	57·5	1 E	Clear	·220	71·5	72·3	59·2	1 N E	Clear
·230	66·0	58·3	53·1	1 E by N	Clear	·293	69·0	66·8	57·5	2 E N E	Clear	·237	72·5	72·8	59·7	2 E	Clear
·233	66·5	60·5	54·7	1 E	Clear	·288	69·5	66·7	57·3	2 E by N	Clear	·228	74·0	73·8	61·0	1 N E	Clear
·222	66·0	59·3	53·4	1 E	Clear	·273	69·0	66·6	58·0	2 E	Clear	·213	73·0	74·3	61·1	1 E N E	Clear
·203	64·5	61·4	56·8	0 E	Clear	·260	70·0	68·3	59·3	0 E	Clear	·208	75·0	75·3	61·7	2 W by S	Clear
·210	66·0	61·3	57·7	0 E N E	Clear	·281	70·0	67·7	60·0	1 E by N	Clear	·229	74·0	73·7	62·6	0 N E	Clear
·239	68·0	63·0	57·3	1 E	Clear	·295	70·5	67·8	59·8	2 E by N	Clear	·244	74·5	74·5	62·9	1 E N E	Clear
·216	67·0	62·1	58·0	1 S S W	Lt Cir.	·278	72·0	69·9	62·1	0 S	Lt. Cirri	·223	76·5	76·7	64·8	1 S E	Cirri
·263	67·5	63·4	59·4	0 W by S	Dull Cirri	·303	72·0	70·8	62·5	1 W by S	Cirri	·251	75·0	75·2	63·2	1 E N E	Cirri
·261	66·0	62·6	58·7	0 E	Cir. Str.	·313	70·0	68·3	59·4	2 E	Cir. Str.	·238	72·0	71·0	61·4	3 E N E	Overct. Cir. Str.
·240	68·0	62·7	56·8	1 E	F. & Cir. Cum.	·276	70·0	68·8	59·5	3 E	Fair & Cirri	·192	73·0	72·4	62·5	1 E	Fair Cirri
·184	[illegible]·0	59·4	53·5	2 N E	Fair Cir. Cum.	·224	67·5	65·4	57·5	4 E	Fair Cir. Cum.	·166	72·0	70·6	60·9	3 E by N	Fair Lt. Cirri
·233	[illegible]·0	63·4	57·8	1 E	Fair Cir. Cum.	·292	71·0	68·8	60·6	2 E N E	Fair Cir. Cum.	·232	73·0	73·5	63·8	2 E	Fair Lt. Cirri
·266	[illegible]·0	63·2	55·4	1 E	F. & Lt. Cir.	·300	70·5	68·1	59·0	3 E by N	Fair Lt. Cum.	·221	72·5	72·7	62·6	2 E N E	Fair Lt. Cirri
·268	[illegible]·5	62·8	56·3	1 E	Clear	·316	70·5	68·7	59·9	3 E	Clear	·237	72·5	72·5	62·4	1 E	Clear
·264	[illegible]·0	63·0	57·4	1 E by N	Clear	·311	69·5	67·3	58·8	3 E	Clear	·208	73·5	72·8	62·4	2 E	Clear
·236	[illegible]·0	60·3	54·3	1 E	Clear	·291	69·5	67·2	59·5	3 E	Clear	·200	74·0	73·0	62·8	1 E	Clear
	[illegible]·5	60·8	55·7	0 E	Clear	·203	70·5	68·1	59·3	0 E	Clear	·112	74·5	74·3	62·6	2 S W	Clear
	[illegible]·0	61·9	56·5	.....	.....	29·267	70·3	68·3	59·5	.....	.....	29·207	73·7	73·8	62·2	.....	.....

Observations at 2h. 40m. P. M.						Minimum Pressure at 4 P. M.						Observations at Sunset.						Under N. Verandah.			
Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 2h.40m.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 2h. 40m. to 4 P. M.	Aspect of Sky.	Barometer unreduced.	Temperature. Of the Mer.	Temperature. External. Of Air.	Temperature. External. W. Bulb.	Wind. Direction from 4 P. M. to Sunset.	Aspect of Sky.	Maximum in Shade.	Minimum in Shade.	Per Black Bulb Registering Instrument Max. in Sun's Rays.	Rain Gauge on Ground, registered at 6 A. M.	Phases of the Moon.
Inches.	°	°	°			29 Ins.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
29·180	73·5	74·1	57·8	2 N E	Cir. Haze.	*·171	73·5	73·8	58·1	0 E	Cirri.	29·182	71·0	70·7	58·8	0 E	Cirri.	76·8	50·7	104·5	...	
·162	74·0	75·5	58·8	2 E N E	Cir. Cum.	·142	73·5	74·0	60·4	1 E N E	Dull Cir. Cum.	·154	71·5	71·1	60·7	0 E N E	Cir. Cum.	77·6	56·2	106·0	...	
·101	74·0	75·4	59·9	1 N E	Dull Cum.	·093	73·0	74·9	61·7	1 E N E	Dull Cum.	·108	72·0	72·6	60·5	0 E	Dull Cum.	77·7	61·3	...	...	●New.
·134	75·5	78·2	65·4	2 E N E	Cir. Cum.	·128	75·5	76·4	65·8	0 N E	Cirri.	·149	73·5	73·1	59·4	0 E	Clear.	77·6	64·8	109·5	...	
·172	76·0	78·1	65·2	0 N by E	Clear.	·160	77·5	77·8	64·3	1 E	Clear.	·183	74·5	73·8	63·9	0 E	Clear.	79·1	59·8	119·0	...	
·172	77·5	78·0	65·1	0 E	Cirri.	·150	78·0	78·9	65·7	1 N E	Cirri.	·176	74·5	74·2	64·4	1 E S E	Lt. Cirri.	80·0	61·2	114·0	...	
·151	76·5	77·4	63·3	1 E	Clear.	·131	76·5	77·4	63·2	0 E	Clear.	·152	74·0	74·1	64·0	1 E	Clear.	78·9	58·7	111·5	...	
·104	77·0	78·4	65·4	2 N E	Clear.	·107	76·0	77·2	63·0	1 W S W	Clear.	·138	74·0	74·3	64·4	1 W	Clear.	80·3	53·8	111·0	...	
·118	80·0	79·5	95·2	1 N E	Clear.	·128	80·0	80·0	64·8	2 W S W	Clear.	·142	77·0	75·3	66·3	1 W	Clear.	80·5	58·7	110·0	...	
·134	80·0	80·4	64·8	2 W by S	Clear.	·112	80·0	80·3	65·3	2 W S W	Clear.	·133	77·5	75·7	63·4	1 W	Clear.	80·9	61·3	103·0	...	
·132	79·0	80·1	66·3	2 W	Cumuli	*·123	78·5	79·0	65·5	1 W	Cumuli.	·146	77·0	75·8	65·0	0 W	Lt. Cum.	80·2	60·8	109·5	...	
·109	75·5	75·3	60·8	1 W N W	Clear.	·100	75·5	76·3	60·1	1 W	Clear.	·132	72·5	72·1	61·2	0 W	Clear.	76·2	61·1	105·0	...	☽ First.
·123	73·5	74·3	58·8	1 E N E	Clear.	·116	73·5	73·9	59·0	0 E	Clear.	·144	72·0	71·2	60·1	0 E by N	Clear.	75·8	53·9	109·0	...	
·161	75·5	77·0	62·3	2 E	Clear.	·146	75·5	77·5	61·6	0 E N E	Clear.	·177	73·0	72·1	60·0	0 E	Clear.	77·3	52·0	111·5	...	
·182	76·5	77·8	62·1	1 E	Clear.	*·178	77·0	76·9	61·7	0 E by N	Clear.	·200	73·5	73·2	61·9	0 N E	Clear.	78·4	54·2	111·0	...	
·173	73·0	76·2	62·2	0 E	Clear.	·164	76·5	76·1	61·9	1 E	Clear.	·185	73·0	72·6	61·9	0 E N E	Clear.	78·2	55·8	112·0	...	
·163	76·5	76·9	60·8	0 E	Clear.	·161	76·5	76·9	61·4	0 E S E	Clear.	·180	74·0	72·4	60·0	0 E	Clear.	78·7	55·0	110·0	...	
·173	78·0	79·4	62·9	1 W	Clear.	·165	78·5	79·6	63·2	2 S W	Clear.	·183	75·5	73·5	61·2	0 W	Clear.	79·8	56·2	106·5	...	
·188	78·0	78·8	63·2	2 W S W	Clear.	·174	78·5	79·0	63·9	1 S W	Clear.	·200	75·0	73·5	62·8	1 W S W	Clear.	79·0	58·3	109·0	...	○Full.
·166	76·0	77·9	63·6	0 W S W	Clear.	·151	76·5	78·3	63·7	0 W by S	Clear.	·182	74·5	71·3	63·3	0 W	Clear.	79·6	58·2	109·5	...	
[illegible]	·770	78·5	64·4	1 S S W	Cir. Haze.	·168	76·5	77·8	64·9	1 W	Cirri.	·195	74·0	73·2	63·3	0 W by S	Cirri.	79·2	57·8	...	...	
[illegible]	[illegible]	[illegible]	[illegible]	3 1 S E	Cir. Str.	·165	76·5	76·4	63·8	1 S E	Cir. Str.	·212	74·0	72·2	63·4	0 S W	Cir. Str.	77·3	60·4	...	...	
·178	[illegible]	77·4	64·[illegible]	[illegible]	Dull Cir. Str.	·170	73·0	72·6	63·7	0 E	Dull Cir. Str.	·202	71·5	71·3	63·9	0 E	Dull Cir. Str.	73·7	58·0	...	...	
·180	77·0	72·6	63·3	0 E	Fair Lt. Cirri.	·112	74·5	73·2	62·6	0 E	Fair Cir. Cum.	·127	72·0	72·3	64·0	0 N E	Fair Cir. Cum.	76·2	60·2	104·5	...	
·182	73·0	75·2	62·5	0 E	Fr. Lt. Cirri	·082	73·0	72·9	62·7	1 E	Dull Cumuli.	·128	72·0	71·3	63·1	0 E	Cum.	76·1	56·9	...	...	
·128	74·5	74·5	62·3	1 E	Fair and Cum.	*·180	74·0	75·4	63·4	0 E	Fair & Cumuli	·204	72·5	73·0	63·4	0 E	Cum.	78·2	60·3	106·0	...	☾ Last.
·096	74·0	76·7	63·5	2 E	Fair Lt. Cirri.	*·143	76·0	76·8	64·0	0 E	Lt. Cirri.	·162	74·0	73·2	63·3	0 E	Lt. Cir.	78·1	60·0	106·0	...	
·183	75·0	76·3	62·9	0 E	Clear.	*·158	74·0	76·6	64·1	1 S W	Clear.	·177	74·0	73·5	63·3	0 E	Clear.	77·5	60·3	104·5	...	
·144	75·0	75·9	63·4	1 E by N	Clear.	*·154	75·5	75·1	62·8	2 E N E	Clear.	·182	73·5	73·6	63·1	0 E	Clear.	77·1	59·4	105·0	...	
·163	74·0	75·8	63·4	1 E by N	Clear.	·118	76·0	75·7	61·4	1 E by S	Clear.	·141	74·0	73·8	63·2	0 E	Clear.	76·7	57·5	109·0	...	
·164	75·0	76·4	62·3	2 S	Clear.	·036	77·0	77·4	63·9	1 W	Dull Cir. Haze	·054	74·0	73·9	63·8	0 W	Dull Cir. Haze	78·6	56·8	112·5	...	
·143	76·0	77·3	63·5	3 S W	Cir. Haze.																	
·050	77·5																					
29·149	76·0	76·9	62·9	.....	.....	29·138	76·0	76·6	62·9	.....	.....	29·162	73·7	73·1	62·7	.....	.....	78·1	58·2	108·9	...	.....

[illegible] 1. Gentle Breeze.—2. Moderate Wind.—3. Brisk Breeze.—4. Strong Wind.—5. Stormy Breeze.—6. Moderate Gale.—7. Gale.—8. Violent Gale.—9. Hurricane.

OBSERVATIONS FOR MAY, 1850.

7th.—At 2·25 P. M. thunder in W. N. W., lightning and thunder (some hail at first) and rain at 2·50., high wind at 3 P. M. from N. W., gale of wind from E. at 3·10, with heavy rain, much thunder and lightning till 3·25, sheet lightning in E & W. at 7 P. M. Electricity freely obtained in afternoon.

8th.—High wind at 1 P. M., with a little rain from N. W., increasing to half a gale at 1·10, attended with thunder and lightning. A good deal of damage appears to have been done by yesterday's gale.

12th.—A few drops of rain at 4 A. M., followed by a strong gust of wind from N. W.

13th.—Some flashes of lightning in S. E. at 8 P. M.

14th.—A dust storm from S. W. at 6·50, P. M., high wind continued subsequently from S. W.; thunder and lightning in that quarter from 7·5 to 7·45 P. M., where dark cumulous masses are rapidly collecting, nimbi in W.—Some rain fell here at 8 P. M. Electricity copious, though fluctuating much in amount.

* 19th.—Barometer Min. was at 3·20 P. M. Inches 28·917, temperature 83°5.

* 20th.—Barometer do do 3·40 P. M. do 29·853, do. 84°0.

25th.—Boiling point of Wollaston's thermometer at 9·50 A. M. 209°81—Do. do. at 4 P. M. 209°49. } For temperature of air at these periods see register.

27th.—Thunder in W. at 5·10 P. M. and continued till 7·15 P. M., high wind at 6·30 P. M. from West, with much dust. Some electric clouds passed over at 6·45, precipitating a few drops of rain. Throughout the day electricity has been more abundant than usual, but strongly affected the electroscope from about 4·50 to 7·45 P. M.; sparks were given off by instrument, and streams f electric light escaped from pith balls which had been propelled to sides of holder from intensity of charge at 6·30. It was an interesting object. Subsequently to 8 P. M. gusts of wind from W. and S. W. with fleecy cumulous clouds and moonlight. Barometer at 10 P. M. Inches 28·808, temperature 93°0.'

29th.—Negative electricity at Noon to 5°. Thunder heard in West at 1·40 P. M. Rain at 1·55. Electricity rapidly + & —, and the balls come into contact immediately *before* the thunder claps are heard; this movement corresponding manifestly to the disruption of electric tension,—the flash being invisible from daylight. A storm of wind from W. at 2·5. Electricity + and continued so for 3 min.; the balls touching glass cover. At 2.25 a clap of thunder, and divergence to 26°. At 2.29, although then separated 35°, suddenly met, and again *repelled* each other, and instantaneously a very loud clap of thunder was heard. 3 P. M. rain—storm has passed, no electricity. 4 P. M., brisk wind from S. W., electricity 30° + : at 5·30 no electricity traceable. Night occasionally moderately clear.

30th.—At 1·25 P. M. (wind W. S. W.) thunder in W. gradually approaching. First indication by electrometer at 2 P. M., repulsion 3°30'. Some rain at 3·30 with loud thunder. Thunder heard without much intermission till sunset. Electrometer not much affected—greatest repulsion 11° at 4·50 during rain,—then positive. Much sheet lightning in point from S. W. to N. W. After 7 P. M. wind brisk.

31st.—1·25 P. M. Thunder in S. W., and in N. W. at 2 P. M.,—2·20, electricity 4°, wind W. by N.,—thunder. 3 P. M. no trace of electricity; storm passed over; Thunder in S. E. 5 P. M. Thunder, which has not altogether ceased, is becoming louder from S. E. 5·15, high wind from S. E. immediately succeeded by a torrent of rain; sky generally overcast; wind at 5·20 suddenly veered to North; no electric action. 5·25, sharp squall from E. S. E. with *heavy* rain. 5·30 high wind and smart rain continued; no thunder. 5·40 a gale suddenly from W. N. W. accompanied by heavy rain. 5·47 wind changed to W. S. W., lightning and thunder now attending the rain. 6·5 clearing off. 7·30 heavy cumulous masses floating in S. W. and N. W., otherwise clear, and stars visible.

OBSERVATIONS FOR JUNE, 1850.

1st.—At 1·25 P. M. distant thunder in N. E. 1·50, approaching rapidly; sky hazy, somewhat darker in N. E.; Wind W. by N.; no electric indication yet. 2·30, thunder still from N. E. 2·43, electrometer suddenly excited to 20°; a strong wind from W. succeeded, storms advancing from W. & S. E.; dark masses of cloud in W. (* Min. of Barometer at 3·35 P. M. 28·717 Temperature 85°) At 3·10, wind, lightning, thunder and rain from W. N. W.; balls collapsed. 4, rain has altogether ceased—a lull. 4·20, a strong wind from W. sprung up, and continued the whole evening and greater part of night.

2nd.—At 6 P. M. thunder in N. W. with short intermissions; clouds in N. W. passing southwards; no electricity here. 6·10, wind N. N. W.; heavy clouds advancing from N. E.; slight notice by electroscope, 4° positive; wind strong from N. E. and balls nearly collapsed. 6·35, wind from W., thunder and lightning continuing. 6·50, wind W. N. W.; electricity 36° rapidly generated—positive. 7, violent storm in S. E., wind N. W.; electrometer 20°—still positive. 7·30, Storm approaching from S. E.; lightning and thunder incessant; Electrometer 40°; Wind, gusty, S. E. 8·15, some rain; storm proceeding over; Electrometer 10°. 8·30, electrometer 3° —negative. * Barometer Maximum at 9·30 A. M. 28·885, temperature 83°5.

3rd.—5·15 P. M., Thunder and high wind from N. W., and at 5·45 sky appeared very threatening. A heavy fall of rain of short duration at 6. Wind veering rapidly round the compass. Night dark and cloudy with a moderate wind, and occasional lightning flashes in N. W. No trace of electricity.

[illegible] P. M., Electricity to 2°; wind E. N. E.; cumuli in eastern hemisphere. 7·15, thunder [illegible] E. and dark banks of clouds are there collecting. 8, a strong wind has been blowing in West [illegible] last-noted period from E. S. E.; incessant flashes of lightning. 8·10, a lull to 50° [illegible] half thunder and lightning in N. E.; rain from [illegible] quarter at 8.30 with continuing [illegible]

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heavy thunder; no augmentation of electrical action. Barometer at 10·40 P. M. inches ·303, temperature by attached thermometer 82°5.

* 5th.—Minimum barometer occurred at 3·30 P. M. 28·601, temperature 87·5.

6th.—Dense hazy sky from 5 P. M. with E. N. E. wind. 6·35, Positive electricity to 27°; ind N. N. E.; no thunder or clouds. 7·15, A few drops of rain, electricity negative 7°. 15, a little rain, wind N. E. 8.30, squally, electricity positive 35°, some drops of rain. 15, Wind lulling, rain increasing,—balls collapsed suddenly; no thunder or lightning, distant under in N. W. at 9; Rain has ceased.

7th.—Smart rain from N. E. at 6·30 P. M. Some vivid flashes of lighting in N. & N. W. at P. M. Night moderately clear.

9th.—Thunder and rain at 4·15 P. M. Electricity 20.° * Barometer min. at 3·15 P. M. ches 28·537, thermometer 90°.

10th.—High wind from W. by N. all day nearly. Electric tension 15°. at 2 P. M. Thunder 4·15 P. M. Electricity 35°. Gale of wind and smart rain from W. by N. Some heavy peals thunder at 4·30. Gentle rain in evening.

11th.—Electricity 21° at 2 P. M. A shower of rain at 2·30. Thunder in W. at 3, sunshine ere, no electricity. 3·20, positive electricity to 5°.,—3·35 to 27°·30′ negative. Loud thunder nd gusts of wind. 4 P. M., a little rain. Incessant thunder till past 5. At 5·40 steady light in; vivid lightning and loud thunder at intervals.

* 13th—Barometer maximum at 9 A. M. 28·808, temperature 87°·5.

15th.—Electrometer affected at 11·50 A. M. Thunder in N. E. at 1 P. M. A smart shower at P. M. with high wind from N. E.

16th.—A gentle shower with thunder and lightning at sunset. Electrometer gave no ndication.

* 17th.—Maximum of barometer occurred at 9·10 A. M. 28·828, attached thermometer 86°.

18th.—Divergence of electrometer to 22° negative, at 4·30 P. M.—high wind. Thunder and ightning in E. S. E. at 6 and subsequently. A few drops of rain experienced here only.

19th.—Electrometer charged at 3·45 P. M., negatively to 30.° Reduced to 18° at 4·10. Thunder in N. W. Divergence to 10° at 5 P. M. Dark cumulous banks approaching from E. N. E. and N. W.; Thunder in both quarters. Electrometer steady at 10°, positive. A heavy fall of rain at 5·35. Incessant lightning and thunder during the rain, and after its complete cessation:—for more than half an hour there was not the least intermission in the roll of thunder. Electroscope positively charged to 5°. The weather cleared up at 6·35 P. M.

20th.—At 5 P. M. the electrometer was first excited to 16°+. Black masses of nimbi banking up in W, and one heavy nimbus in E. N. E. Thunder at 6 in E. N. E. At 6·20 a moderate shower of rain with some wind from the same quarter; pith balls in contact; some thunder and lightning. At 6·45 steady rain commenced from S. W. and continued for half an hour, subsequently it was close, without a movement in the air. Commenced to rain again lightly at 9 P. M.

21st.—At 5·45 P. M. heavy rain, lightning and thunder, firstly from E. and then S. W. till nearly 9 P. M.,—from the latter quarter 2 or 3 complete downpours occurred. At 6 P. M. the loudest peal of thunder ever heard in India took place—it was an intensely sharp metallic sound, and resembled thunder, as ordinarily heard, as little as could be. Not a trace of electricity could be detected throughout the day.

22nd.—Commenced to rain, with lightning and thunder, from E. N. E. at 8·25 P. M., and continued pretty steadily for an hour, raining occasionally afterwards till 10·45 P. M. Electroscope unaffected.

23rd.—High wind from N. W. amounting to a moderate gale at 7·10 P. M.; electricity negative to 6°. At 7·30 it commenced to rain heavily, accompanied with much lightning and thunder, and strong gusts of wind from S. E.; steady rain till nearly 10, and distant lightning and thunder.

29th.—9 A. M., Boiling point of Thermometer 209°·57. Temperature of air 85°. Barometer 28·302. Temperature 85°. Aneroid Barometer 28·680. Temperature 87°.

29th.—9·50 A. M., Boiling point of Thermometer 209·64. Temperature of air 86°. Barometer 28·313. Temperature 86°.—Aneroid Barometer 28°·680. Temperatue 87°.

OBSERVATIONS FOR JULY, 1850.

2nd.—Yesterday and to-day have felt very oppressive. A slight shower in afternoon; cloudy night.

3rd.—Gentle shower at noon.

4th, 5th, 6th.—Flying clouds, heat very oppressive.

7th.—Cloudy and close throughout the day. In the evening (6·20) a smart fall of rain with thunder and lightning. Distant thunder in S. E. till near midnight.

8th.—A little rain at 4·50 this morning, temperature somewhat reduced.

9th.—Smart showers at intervals all day. * Min. of Barometer occurred at 3 P. M. inches 28·727, Temperature 85°.

10th.—The heat is again augmenting, and to-day has been extremely oppressive.

12th.—The sky is frequently clear for a few minutes, and the power of the Sun is still great. The h[illegible]use is much complained of. Not a breath of wind is stirring.

[illegible]er in S. E. at 2·45 P. M. 4 P. M., still thundering, but in E. 4·15, heavy rain [illegible]th lightning and thunder. 4·30. lightning, thunder and rain continuing,—wind [illegible] lightly at 5·45. Distant thunder in S. W.

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15th.—A shower with a little lightning and thunder at 4·15 P. M. from E. A loud clap of thunder at 4·50. Light showers in evening and night.

16th.—Showery, more or less, throughout the day. A dead calm—extremely oppressive.

17th.—Some thunder in S. E. and N. W. from noon till evening. Appearances threaten much rain from N. W. A smart shower at 11·30 P. M. with lightning and thunder.

18th.—Rain early this morning; dark cumulous clouds on horizon all round. 12·45, a loud peal of thunder from S. E.; a shower with thunder subsequently. 3 P. M., thunder still continuing at long intervals.

19th.—Rain in misty showers. Nimbi traversing rapidly from S. W. to N. E. in evening. Partial moonlight. At 10·40 P. M. remarked a beautiful colored halo surrounding the Moon of 13° in diameter: the outer color was a thin rim of red—the next a broad belt of blue,—and the inner was a brown decreasing in depth of colour till it arrived within 3 degrees of the body of the Moon, the outline of which was well defined, although fleecy clouds were rapidly passing over it. This somewhat unusual phenomenon gradually vanished, the red colour being lost first, and no halo of any nature was observable about the Moon at 10·50.

20th.—A heavy fall of rain early this morning. Distant thunder at long intervals in the middle of the day. Occasional light showers.

21st.—A little thunder now and then at noon, and frequent slight showers. In the evening it held up, and the aspect of matters seemed to indicate a break in the weather. Moon shone brightly. At 11·30 a heavy shower.

22nd.—Frequent showers early this morning. Day overcast and dull. Misty rain.

23rd.—Gentle rain in morning. At 8·30 sky uniformly overcast, and a gentle rain falling. 11 A. M., partially clear.

24th.—Light showers. Some rumbling distant thunder. * Max. of barometer at 9 A. M. inches 28·672, Temperature 80°.

25th.—Rain early this morning. At 5·45 thunder and heavy rain—ceased at 6·40 A. M. Dull dismal mid-day. At 1·50 P. M. thunder and very heavy rain, continuing without intermission till 6·45 P. M. Subsequently showers.

26th.—Showers, sometimes smart, all day; no thunder.

27th.—In most respects a similar day to the preceding, but the showers were lighter.

28th.—An apparent change in the weather. A good deal of sunshine. Night generally pretty free from clouds.

29th.—Day promises to be fine. Some fleecy cumuli travelling S. Eastward early part of night.

30th.—Day was mainly fine and pleasant. In the evening banks of cumuli appeared in W., and the night was threatening and cloudy. Very slight drizzling rain about 10·30 P. M.

31st.—Some rain early this morning. A few drizzling showers in forenoon. In afternoon and evening clouds collected in S. W. and E. At 6·15 P. M. the wind veered suddenly to E. N. E., and was succeeded by a heavy fall of rain from that quarter. Night dull,—nimbous scud from S. W. The rain gauged (·368) recorded on the 1st August.

NOTE.—The conductor to my Electrical apparatus, I regret to say, was so much damaged by a (supposed) gust of wind in the early part of this (July) month, as to arrest further investigations in that branch of Meteorology for the present.

OBSERVATIONS FOR AUGUST, 1850.

1st.—Smart showers throughout the day—the sun appearing frequently, and rendering the air oppressive.

2nd.—Frequent drizzling showers in morning and forenoon. Afternoon and night cloudy.

3rd.—Occasional showers during the morning; sky uniformly overcast. At 12·35 P. M. it commenced to rain heavily, and continued with slight intermission till 7 P. M. Recommenced at 7 45 and continued throughout the night, with frequent downpourings. We have not had heavier rain before this monsoon.

4th.—Raining at 4·50 A. M. gently. River full from bank to bank. Rain decreased slightly at 6·30 A. M. Light showers during the day. Evening free from rain. River quite full. At 9·15 P. M. gentle rain. * Minimum of barometer at 3·30 P. M. Inches 28·643, temperature 79°5.

5th.—River still full. Gentle drizzling rain. Noon, the river has somewhat subsided. One or two quiet showers in evening. * Minimum of Barometer at 3·30 P. M. Inches 28·669, temperature 81°.

6th.—Overcast morning. Nimbi coming up from W.—frequent heavy rain. Noon, showery. River has fallen much. Heavy rain commenced at 7·10 P. M. and continued till about 11 P. M.

7th.—Dark masses of cumuli general. Some smart sudden showers. Night cloudy.

8th.—A few scanty showers throughout the day.

9th.—One trifling shower at 4·35 P. M. Night partially starlight.

12th.—Moderately fair. A warm day. Some moonlight.

14th.—The sun has considerable power, and the days and nights are oppressive. Minimum of Barometer at 3·35 P. M. Inches 23·37, temperature of attached thermometer 85°5.

15th.—A cloudy day, but oppressively close. Occasional moonlight.

18th.—A very close disagreeable day. Clouds have been collecting steadily since morning. A gentle shower at 8·30 P. M. Night cloudy, with but trifling moonlight.

19th.—Noon, wind variable, vane pointing principally to E. and N. E. 12·30 P. M., heavy rain and light wind from N. E. generally overcast. 12·45, two heavy peals of thunder, rain less, Wind again S. W.—at 1 P. M. rain had ceased. Occasional peals of thunder in West subsequently.

20th.—Foggy morning, cleared up about 8·30 A. M.; a slight shower in forenoon.

21st.—The whole day disposed to be fair. Clouds collecting in S. W. in evening.

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22nd.—A misty rain in morning. Strange threatening forenoon, a shower at 4 P. M. At 7·45 P. M. it commenced to rain heavily from W. S. W., with vivid lightning and loud thunder. At 8·25 P. M. rain began to abate, the lightning and thunder continning more frequently. All had ceased at 9 P. M. Calm, cloudy night.

23rd.—Some slight rain in morning. Partial sunshine in forenoon. A gentle shower at 4·10 P. M. Dark banks of clouds are rising up from W. and S. W., and appearances are threatening. High wind at 6 P. M. from West. 6·20, a smart fall of rain. Evening and night had scanty showers occasionally. Night cloudy.

24th.—Overcast sky with a drizzling rain in morning. Gentle rain commenced at 10·30 A. M. and continued till 1·45 P. M. It recommenced smartly at 2·30 P. M. and continued, with slight intermission, till sunset. Night overcast, with occasional drizzling rain.

25th.—Morning showery. Forenoon fair, with small cumuli passing the sun frequently. At 2 P. M. a gentle shower during sunshine. Wind shifted at 3 P. M. to E. N. E. At 3·10 gentle rain from that quarter, and at 3·15 hard and smart with loud thunder. At 3·20 the wind veered to W. by N., the rain descending in torrents; sky uniformly obscured. 3·35, wind N. N. W., rain continuing heavily, with vivid lightning and loud peals of thunder from E. N. E. 3·45, rain ceasing—some rumbling thunder in S. W. 4·45, wind due east, and the rain has increased, descending steadily. Evening fair—rain ceased at 5·30 P. M. Occasionally the moon shone brightly.

26th.—Morning fair with cumulous clouds in West. Day inclined to be fair. Some moonlight.

27th.—A moderately fine day.

28th.—A moderately fine day, with slight showers now and then.

29th.—A smart shower at noon. Day generally overcast.

30th.—A drizzling rain in morning. Rather a dull day. A little sprinkle of rain in the evening.

31st.—Morning dull, with misty rain. Midday partially fair. Thunder in W. and N. W. from 4 to 6 P. M., occasionally very loud. Banks of dense white cumuli-strati in that quarter. Rain commenced (without thunder or lightning) at 8·45 P. M. in torrents, and continued till 9·5—subsequently in gentle showers till nearly 11 P. M. Night uniformly overcast and dark. (The fall of rain is recorded on September 1st.)

OBSERVATIONS FOR SEPTEMBER, 1850.

1st.—Slight misty rain in morning. Day generally overcast.

2nd.—A warm close morning with a little rain. Disposed to be fair in afternoon.

3rd.—A very warm close day with barely a breath of air stirring. Rain after sunset. Night dark and dull.

4th.—Another calm oppressive day. River has risen considerably. Dull cloudy night.

5th.—The day occasionally fair. Heavy rain at 9 P. M. and occasionally subsequently. River still filling.

6th.—Day overcast and cool; heavy clouds in N. E. and E. with vivid lightning in that direction at night. The river commenced to fall this afternoon.

7th.—Dull, calm, heavy and somewhat oppressive day. Much lightning at night in S. E. & E.

8th.—A smart shower of rain at 12·20 P. M., with high wind from W., much thunder. River filling.

9th.—Rain descended in torrents a little after sunset, and continued with little or no intermission till past 10. Rain occasionally during the night. Much thunder and lightning. Wind at the onset of the rain due E.

10th.—Slight rain early this morning. River quickly filled from bank to bank. Frequent showers throughout the day. Heavy dark electric cumuli in E. in afternoon. Loud peals of thunder from 1 P. M. to sunset, passing over gradually from E. to W.

11th.—Morning dull, light flying clouds and a moderate wind throughout the rest of the day. River has fallen much. Thunder was incessant in the afternoon from N. E.

12th.—A gentle shower experienced at noon. Vivid lightning in E. in evening. Latter part of night dull and heavy.

13th.—A few drops of rain now and then during the day.

14th.—There is not much water in river to-day. The weather is apparently becoming fine.

15th.—Hazy cumuli obscured much the sun to-day. Dew at night commencing immediately after sunset.

16th.—A close morning, the rest of the day more pleasant. * The minimum (P. M.) occurred at 3·30—29·917 inches, Thermometer 84°0—cotton wool, which had been exposed during the night, had increased in weight 43 per cent.

17th.—Mornings and evenings cool and pleasant, but the middays are becoming hot. Heavy dew at night, which was almost throughout cloudless. Cotton increased 49 per cent by exposure at night.

18th.—Clear bright day with an augmented temperature. * Minimum of Barometer at 3·35

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P. M. Inches 28·845, temperature 84°5 of attached thermometer. Augmentation to cotton wool, exposed as before, 40 per cent.

19th.—As yesterday a warm clear day, morning and evening agreeable, though the temperature in sun has increased. The minimum of barometer took place at 3·45 P. M., inches 28·856, temperature 85° ; less dew at night. Increase to cotton only 37 per cent.

20th.—The sun has had great power notwithstanding its frequent obscuration from passing white cumuli. In evening black masses of clouds banked up in N. E. horizon. The exposed cotton only gave an increased weight of 16 per cent.

21st.—An oppressive morning. Dew only to the amount of 12 per cent. The boiling point of Wollaston's thermometer at 9·50 A. M. was 209°93, ambient air 82·5 ; at 4 P. M. 209°75, air 86°5 ; Midday very close. At 3·50 P. M. thunder in N. E., Wind west 4·10, high wind from N. E. ; thunder continuing ; heavy banks of clouds coming up from the last named quarter. 4·20 P. M., Smart rain from N. N. E. with high wind till 4·35. Subsequently sunshine. General dulness in E. and S. E. quarters, whence thunder is occasionally heard. Early part of night more or less cloudy.

22nd.—Thunder from E. and N. E. at 2·25 P. M. Large electric cumuli passing the zenith from time to time. 3 P. M., Smart shower of rain and a partial squall from E. N. E. Heavy peals of thunder which continued till nearly 4 P. M. Wind veering to all points of the compass. Diffused cumuli in S. W. with an appearance threatening much rain. Vane steady at W. The east was covered with detached cum. as the moon rose, but these dispersed shortly above hor. to a large extent—below, less so, at 10 P. M. she had a ragged cirrous halo of 40° in diameter encircling heavy bodies of white irregular clouds in S. S. E.

23rd.—A close still forenoon. A peal of thunder at 2·10 P. M. Continued heavy thunder from 3·30 till past 5 in E. and N. E. Dark masses of cumuli ascending in W. Incessant lightning from sunset in North, where a black mass of clouds had collected by 10 P. M. Wind then from that quarter. 10·30, Lightning and thunder and gusts of wind from the same point of the horizon. At 10·45, heavy and intermittent rain till 11·20, with vivid flashes of lightning, loud thunder, and gusts of wind from North. The night afterwards was still, with moonlight at intervals.

24th.—Thunder at 12·10 P. M. in W., dark elevated cumuli in that direction. Wind inclined to be variable. At 2 P. M. thunder again heard. Clouds passing over head rapidly. Distant peals subsequently from E. till 3·30, when heavy rain descended from S. E. preceded by high wind,—sky much overcast, rendering the lightning plainly visible. Rain ceased at 3·50, the thunder pealing afterwards in W. Evening cloudy and threatening.

25th.—Thunder at 2·10 P. M. Dark collections of cumuli in N. W. Smart shower from S. at 2·40 P. M., when the instrumental readings were being recorded. Thunder in S. E. afterwards ; sky dull and overcast at 3·15, and clear at 3·30 P. M. Wind due West. From 9 P. M. clouds began to gather in E. N. E., and by 10 there was one black dense mass extending from N. E. to S. E. At 10·45 loud peals of thunder and very vivid lightning occurred, with strong gusts of wind from N. E. No rain fell. The lightning and thunder were noticed till nearly midnight.

26th.—Disposed to be fine. Small scattered cumuli and a brisk wind from noon.

27th.—No dew. The cotton had only increased 3 per cent. The sun rose brightly. Nimbus clouds had collected on horizon about 8 A. M., and to-day became generally overcast, with frequent showers.

28th.—A cloudy pleasant day. No rain. Night bright and almost clear.

29th.—Much dew, in places dropping from lower branches of small trees. The cotton wool had an augmentation of weight of 52 per cent. Thermometer boiled at 9·50 A. M. at 210°01, temperature 80° ; at 4 P. M. 209°76, temperature 85°. Day warm and occasionally hazy.

30th.—An increase of 44 per cent in cotton. Day oppressively close. At 4·30 P. M. a little thunder in S. E. At 5 a black bank of cumulous clouds had there collected, and at 5·15 loud thunder was heard. At 5·25 a small segment of a rainbow, well colord, in E. S. E. Sky became generally overcast ; wind south ; thunder continued. At sunset the southern hemisphere was uniformily clouded, and presented every indication of an impending storm. Thunder and lightning ceased about 7 P. M., and at 10 P. M. only a few dark clouds were floating about. Stars bright. Boiling of thermometer at 9·50 A. M., 210·13, temperature 81·5 ; at 4 P. M. 209°87, temperature 85°5.

Total Evaporation per Atmometer, for the month, cubic inches 15·217 per square foot of surface.

OBSERVATIONS FOR OCTOBER, 1850.

1st.—Dark cumulous clouds were remarked in E. N. E. about 1 P. M., and at 4·25 P. M. thunder from that point was heard. The night was clouded and still, and at 11 P. M. a little rain fell.

2nd.—The weather cleared up and promised to be fair till about 3 P. M., when clouds were observed collecting in N. E. This threatening passed away, and the night was partially starlight. * Minimum of barometer occurred at 3·30 P. M. Inches 28·951, temperature 84°5.

3rd.—Some hazy cumuli gathering at 11 A. M. in E. A gentle shower at 12·20 P. M. from S. E. 1·40 P. M., thunder in S. E. at intervals of 3 or 4 minutes ; some electric-capped cumuli in that quarter ; Wind 2 S. by E. Slight cessation of thunder about 3 P. M. 4·15, the thunder, which has not altogether ceased, is now louder and more frequent, Southwards, nearly from E. to W.

the sky wears a very threatening appearance, and is one uniform black mass of cloud,—Northwards it is devoid of any clouds whatever; occasional strong puffs of wind from S. E. As the sun went down the lightning was very vivid and frequent, followed very quickly by the thunder. It is raining heavily along the whole of the southern horizon. 7 P. M., a few drops of rain here, lightning and thunder continuing; the entire sky to the south is yet murky and overcast. About 9 P. M. the lightning and thunder at long intervals passed to S. W., but did not wholly cease till 9·30 P. M. The northern aspect of sky but slightly studded with ragged cumuli.

4th.—At 10·20 dark cumuli noticed in N. W. lying along the horizon at a low elevation; a haziness of atmosphere here advancing. 1 P. M., loud peals of thunder in N. W., vane steadily east. Thunder continued at intervals till late in the evening; vivid lightning occasionally in S. 10 P. M., starlight, with a peculiarly dark clear neutral tint colour of sky. Dew 59 per cent.

5th.—A dense fog on the opposite side of the river at day light, and continuing for some time after sunrise,—cotton had increased 82 per cent during the night. Dark masses of cumuli in horizon all round, and occasionally traversing zenith, from 11 A. M. Wind 3 N. W. at 3. P. M. At 3·35, thunder from North, and a small portion of a rain-bow just above horizon in N. E. Dark electric clouds in all directions, intercepting sunshine occasionally. Night clear.

6th.—Dew amounted to 87½ this morning per cent. A few light cirri in E. A warm day. Some clouds collected in N. W. in the evening. Night upon the whole clear.

7th.—Dew 41½ per cent, a clear fine day. Some fleecy cirri-stratus at night.

8th.—Thunder in N. and N. W. at 4 P. M. At 4·40, very light Wind from N. with drops of rain, subsequently wind from E., and finally half a gale from W. Evening clear.

14th.—Dew amounted this morning to 38 per cent.

15th.—Cotton gave an augmentation of 23½ per cent. A warm, somewhat oppressive day.

16th.—Dew 15 per cent. A similar day to yesterday.

17th.—Some places were quite free from any trace of dew, and the cotton only indicated 8 per cent increase. The sun was very powerful, and the air was oppressive and still. The wind changed to W. by about 11 A. M. Night partially clear.

18th.—No dew observed this morning. Light cirrus clouds in the morning; noon clear; afternoon cloudy;—a slightly cooler day than yesterday in consequence.

19th.—Minimum register thermometer (without the parabolic reflector) exposed fully to the sky marked 57°. The dew amounted to 23 per cent.

20th.—The same thermometer, similarly exposed, read this morning 52°5 (bulb quite dry.) Dew 7½ per cent.

21st.—External minimum thermometer 56°, dew 5 per cent.

22nd.—Ditto ditto 59°5, dew 1½, only, per cent.

23rd.—There was no increase in weight of exposed cotton this morning, nor a trace of dew about the grass, and the index of the external thermometer stood at 68·5. Day dull and overcast. Some few large drops of rain fell at 2·5 P. M. and slight rain in evening. * Minimum of barometer took place at 3·25 P. M. Inches 29·033, attached thermometer 82·5. Night cloudy till 11, subsequently only partially obscured.

24th.—A heavy bank of clouds formed in east in afternoon, whence thunder was heard at 4·15. Smart rain descended at 5·45 P. M. it's direction from that quarter, and continued till nearly 7 P. M. * The P. M. Minimum of barometer occurred at 3·30, inches 28·919 temperature 84°, and no rise could be detected till 5·01 P. M. It rained occasionally in the night.

25th.—Was a very oppressive day, and a short shower took place at 2 P. M. In the evening steady rain, with lightning and thunder from West, set in and continued till 9. Night cloudy. * Barometer attained its P. M. minimum at 3·35, inches 28·922, temperature 83·5, and was disinclined to rise till 5·30. Electricity scanty, and with difficulty excited.

26th.—Morning dull and overcast, and rain commenced at 7 A. M. ceasing at 8·35. A shower at 1·30 P. M. Sky generally overcast. Began to rain steadily at 7·10 P. M. and continued till nearly 9·30. Occasional light rain in the night.

27th.—Morning and evening were cloudy. Midday was fair. Night cloudy.

28th.—In the morning the sky was well covered with cirro-cumuli; at 1·30 P. M. it rained heavily for a short time. Afternoon and evening were cloudy and dark. * P. M., Minimum. of barometer was found to be at 3·40. inches 28·901, temperature 82°. Night occasionally starlight.

29th.—The late unseasonable weather appears to have passed off, as to-day is disposed again to be fair. * The minimun of barometer was at 3·40 P. M., inches 28·934, temperature of mercury. 83·5. Electricity is becoming abundant and readily excited. Night generally clear—a few cirro-strati along the north-west horizon only.

30th.—A fine clear refreshing day. Clouds strewed here and there on the horizon all round about 10 A. M

31st.—Light cirri throughout the day, which has been warm and disagreeable. Electricity free.

Total evaporation per Atmometer for the month cubic inches 30·790 per square foot of surface.

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OBSERVATIONS FOR NOVEMBER, 1850.

1st.—About 11 A. M. heavy masses of clouds began to collect in N. W. and N., continued cloudy the whole afternoon and evening: a few drops of rain. Appearances from E. to W. by North, immediately after sunset, threatened rain. About 9·30 the stars were more generally visible, and the clouds were only in patches. By 11 the sky was clear and serene.

*3rd.—Minimum of Barometer occurred at 3·35 P. M. Inches 29·024, temperature 84°.

4th.—A meteor of the size and brilliancy of Venus was observed at 7·18 P. M. to descend perpendicularly from about 4° below ζ in the foot of Perseus, and disappear, without leaving any luminous train, when about 10° above the horizon.

5th.—Strange chilly dismal morning and noon. Sky covered with cirro-cumuli. Occasional large drops of rain. Sheets of rain, apparently in S. E. during the morning, in S. at noon, and W. S. W. at sunset. Night clear.

*9th.—Maximum of Barometer occurred at 9·30 A. M., inches 29·205, temperature of mercury 75° 5′.

11th.—Slight dew in patches, cloudy night, sky covered with small cumuli: clear towards morning. No cotton exposed.

*12th.—Minimum of Barometer took place at 3·45 P. M., inches 28·856, temperature 78°.

17th.—Do. do. 3·25 P. M., inches 29·044, temperature 73° 0′.

*20th.—Maximum of Barometer occurred at 9·35 A. M., inches 29·189, temperature 70° 0′. *Minimum at 3·30 P. M., 29·080 inches, temperature 78° 5′.

*21st.—Minimum of Barometer took place at 3·40 P. M., inches 29·151, temperature 78° 5′.

*25th.—Maximum of Barometer occurred at 9·30 A. M., inches 29·259, temperature 72° 5′.

*28th.—Do. do. 9·35 A. M., inches 29·321, temperature 76° 0′.

[Being unable to quit my cot, from the cause stated, on the noons and subsequent periods for observations of 28th and 29th, I had the aneroid, an excellent one, with vernier reading to 500th of an inch, and rated with a mercurial Barometer brought to me, and the following were its indications, which, however, I have thought it better not to introduce on face of register.

Date.	At apparent noon.	At 2·40 P. M.	Min. at 4 P. M.	At Sun set.
28th	29·237	29·182	29·163	29·181
29th	29·246	29·190	29·174	29·189

The ascertained correction of ·002—per degree of Fahrenheit, for readings of attached Thermometer, has been applied to the above.

The month was unusually steady in its characters, and afforded but few incidents for record in excess of those noted in Register.

I regret to say that my Electrical Conductor has been again placed hors de combat by the breaking of the glass upper joint by the crows alighting thereon. Should I remain here, I shall erect a stable permanent structure, in defiance of the birds above, and white ants below.

Total Evaporation per Atmometer for the month, Cubic inches 38·319 per square foot of surface.

Notes of the amount of Dew indicated by exposed Cotton, and of the external Minimum temperature without parabolic Reflector, for November 1850.

Date.	Minimum Tempt.	Increase of Cotton per cent.	Remarks.
1	°	42	Bulb wet.
2		61	Bulb dry.
3	61·5	7	Night and morning clear.
4	57·0	2	Morning clear.
5	57·5	3	Cir. Cum. in morng.
6	52·5	62	Bulb dry.
7	59·5	7½	Do.
8	51·0	12	Do.
9	55·0	8½	Do.
10	60·0	12	Light Cirrous haze at sunrise. Bulb dry.
12	50·5	34½	Clear morning, bulb wet.
13	42·0	40	Bulb covered with dew, external temperature by another Thermometer placed out before dawn of day, 46° 5′.
14	41·0	49	Bulb covered with dew, another Thermometer at dawn gave 47°.
15	43·0	58	Bulb covered with dew, another dry Thermometer gave 49°.
16	48·0	21	Bulb dry.
17	50·5	2½	Do.
18	47·5	20	Do.
20	44·5	14	Do.
21	43·0	27	Do.
22	47·5	33	Bulb wet.
23	49·0	54	Do.
24	49·5	62	Bulb quite wet.
25	50·5	38	Bulb dry.
26	47·5	32½	Bulb slightly tarnished.
27	51·0	4	Bulb dry.
28	45·0	11	Do.
Means.	50·1	27 per cent.	

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OBSERVATIONS FOR DECEMBER, 1850.

1st.—A few light cirri in East at a good elevation after sunrise. Haziness at noon and afternoon. The Minimum P. M. tide of Barometer turned at 3·45, inches 29·165, temperature 73° 5′. Light cirri at night.

2nd.—Throughout a cloudy day with an increase of temperature.

3rd.—Morning dull, heavy, and threatening rain; and these indications continued steadily the entire day. Barometer showed a rapid descent. Night less clouded.

4th.—Cloudy morning, the day disposed to be fair. Evening clear. Barometer rising. From 5th to 20th nothing worthy of record, not entered on Register, transpired, except that on the

11th P. M. minimum of Barometer took place at 3·35, inches 29·117, temperature 79° 0′.

15th.—Do. do. 3·50, do. 29·175, do. 77° 0′.

21st.—A few light straggling cirri were observed about the horizon the entire day, and a slight haze early in afternoon. Night clear and bright.

22nd.—An unpleasant, still, warm, cloudy morning. Clouds throughout the day.

23rd, 24th and 25th.—Uncertain cloudy weather prevailed. On 24th Barometer fell considerably, and continued its descent to evening of 25th, and the prospect of rain from united circumstances was strong.

26th.—A great rise in Barometric height. A fair day upon the whole. The P. M. Minimum of Barometer at 3·35, inches 29·172, temperature 74° 5′.

27th.—P. M. minimum of Barometer at 3·50, inches 29·140, temperature 76° 0′.

28th.—Do. do. 4·15, do. 29·152, do. 74° 0′.

29th.—No tide of the mercury from 3·30 to 4·35 P. M.; it stood at 29·154 the whole time. At 10·30 P. M. it attained to inches 29·296.

30th and 31st.—Exhibit a gradual decrease of pressure, and I regret that I cannot trace the fall into January 1851, as having been unexpectedly directed to proceed with the Head Quarters of the 7th N. I. to Jaulnah, I can barely command sufficient time to pack up my apparatus and instruments for transmission to Nursingpore.

Total evaporation per Atmometer, for the month, 42·293 cubic inches per square foot of surface.

Notes of the amount of Dew indicated by exposed Cotton, and the external Minimum temperature without the Parabolic Reflector, for December 1850.

Date.	Minimum Tempt.	Increase of Cotton per cent.	REMARKS.
	°		
2	42·5	22½	Bulb dry.
3	47·5	2	Do.
4	54·0	No Increase.	Do.
5	48·5	45	Bulb covered with dew.
6	49·5	36	Do. do.
7	50·0	38	Bulb dry.
8	50·5	31	Do.
9	47·5	58	Bulb wet.
10	49·0	51	Do.
11	48·0	36	Do.
12	45·0	22	Bulb slightly wet.
13	41·0	34½	Do. wet.
14	42·5	54	Do.
15	43·0	24	Bulb dry.
16	47·0	7	Do.
17	46·5	7	Do.
18	44·5	23	Do.
19	45·5	56½	Bulb wet.
20	49·0	11	Bulb dry.
21	48·0	43	Do.
22	49·0	36	Do.
23	48·0	34	Bulb dimmed.
24	48·5	21	Bulb dry.
25	51·0	4½	Do.
26	54·0	3½	Do.
27	52·5	4	Do.
28	51·5	No Increase.	Do.
29	51·0	10	Do.
30	47·5	36	Do.
31	47·5	42½	Do.
Means	47·9	28·3 per cent.	

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Days of the Month.	Observations at Sunrise. Barometer uncorrected.	Temperature. Of the Mer.	External. D. Bulb.	External. W. Bulb.	Wind. Direction and force from Sunset to Sunrise.	Aspect of Sky.	Maximum Pressure at 9h. 50m. Barometer uncorrected.	Temperature. Of the Mer.	External. D. Bulb.	External. W. Bulb.	Wind. Direction and force from Sunrise to 9h. 50m	Aspect of Sky.	Observations at Apparent Noon. Barometer uncorrected.	Temperature. Of the Mer.	External. D. Bulb.	External. W. Bulb.	Wind. Direction and forces from 9h. 50m. to apparent noon.	Aspect of Sky.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
1	28·964	75·5	66·8	56·7	0 E N E	Clear	28·017	80·0	85·1	61·5	1 E	Clear	28·014	81·0	91·8	67·6	2 N W	Clear
2	·979	75·0	64·9	54·4	1 N N E	Clear	·058	78·0	88·2	67·0	1 N N E	Clear	·031	80·5	93·2	67·0	2 N W	Clear
3	·918	69·0	66·3	56·3	1 S E	Clear	·094	78·0	90·7	67·6	0 S W	Clear	·912	80·5	97·7	65·9	1 S by W	Clear
4	·854	72·5	70·8	58·9	2 N W	Cirri Hazy	·928	80·5	91 0	66·0	1 N W	Cirri Haze	·851	82·5	98·4	69·9	2 N N W	Very Hazy
5	·819	76·0	75·4	59·7	0 W	Hazy	·880	81·5	95·6	67·0	2 N	Lt. Haze	·800	83·0	98·4	70·8	2 N by W	Haze
6 S.	·831	76·0	76·3	61·1	1 W S W	Cirri	·909	82·5	92·5	70·5	1 N by W	Lt. Haze	·845	83·0	97·6	71·2	2 S W	Cirri
7	·885	76·0	76·3	63·7	1 W	Cirri Cum.	·950	83·0	92·4	70·8	2 N N W	Cirri	·890	81·0	97·8	71·1	1 N by E	Cir. Haze
8	·890	79·0	78·9	66·4	1 N by E	Cum.	·951	85·0	93·6	70·7	4 S E	Cirri	·907	85·0	98·4	74·2	2 S E	Clear
9	·881	80·0	81·0	67·2	1 N	Cirri	·922	84·5	95·7	71·6	1 N by W	Cirri	·883	85·5	99·9	71·6	1 N	Cirri
10	·826	77·0	76·7	64·3	1 S E	Cirri Cum.	·896	83·5	93·4	70·1	1 S E	Cirri	·842	84·0	99·8	72·5	1 S S E	Clear
11	·792	76·0	78·4	63·6	1 N E	Haze	·847	84·5	95·3	70·5	1 N E	Clear	·792	85·0	99·5	72·1	1 N	Hazy
12	·762	73·0	75·4	62·1	1 S E	Cirri	·832	84·0	94·7	67·8	1 E	Cir. Haze	·765	85·5	99·2	72·0	1 N W	Cirri Cum.
13 S.	·781	75·0	75·0	63·2	1 E S E	Cirri Cum.	·860	83·0	93·4	71·2	2 N	Cirri	·801	85·0	99·7	71·9	1 N W	Cirri Cum.
14	·813	76·5	78·4	62·9	1 E S E	Cirri	·920	85·0	96·8	67·2	1 E	Clear	·876	85·5	101·6	72·1	1 S E	Cirri Cum.
15	·830	80·0	80·8	65·3	1 E	Cirri Cum.	·896	86·0	97·4	68·5	2 S E	Cirri	·833	86·5	102·9	71·2	2 S E	Cirri
16	·784	78·5	79·1	60·8	1 S E	Clear	·847	83·5	99·2	73·8	2 S W	Clear	·787	86·5	102·6	72·1	1 N	Cirri Cum
17	·802	82·5	83·8	65·4	1 S E	Cum.	·848	84·5	98·5	69·0	3 W N W	Lt. Cum.	·768	87·5	101·9	69·7	3 N by W	Lt. Cum.
18	·773	81·0	81·1	63·4	1 N W	Lt. Cum.	·844	85·0	96·8	70·7	3 N N W	Clear	·739	87·0	101·0	70·4	3 N W	Clear
19	·865	82·5	83·4	70·9	0 N by W	Dense Haze	·907	85·0	94·2	74·0	0 S by E	Dense Haze	·860	85·0	100·1	73·5	1 S W	Cum and Haze
20 S.	·818	78·0	80·2	67·4	2 E S E	Hazy Cum.	·892	85·0	93·4	72·3	1 S E	Lt. Cum.	827	87·0	98·1	70·5	3 N	Lt. Cum.
21	·782	78·0	79·1	69·0	1 S E	Lt. Cum.	·812	86·0	95·0	69·9	2 E	Clear	·730	86·5	98·4	72·3	2 N by W	Cum.
22	·719	82·0	83·6	67·3	1 E S E	Cum.	·758	86·5	94·7	70·0	1 N E	Cum.	·691	88·0	98·8	73·6	2 N E	Cum.
23	·634	83·0	85·8	66·4	1 W	Cum.	·613	87·0	98·2	72·4	3 N W	Clear	·582	88·5	104·2	72·3	4 N W	Cum.
24	·704	81·5	83·1	67·3	1 S W	Clear	·760	86·0	99·4	73·0	1 S W	Clear	·677	88·0	103·7	73·8	4 N W	Clear
25	·714	79·0	80·0	64·5	1 N W	Clear	·779	89·0	100·4	73·5	2 N W	Clear	·716	89·5	104·7	74·7	3 N W	Clear
26	·664	85·0	85·9	63·3	1 N W	Clear	·692	89·0	98·8	70·6	3 N N W	Clear	·600	89 0	104·0	72·4	3 N W	Clear
27 S.	·633	84·0	84·6	65·0	1 N W	Clear	·682	87·5	98·9	71·7	2 N N W	Clear	·613	80·0	103·8	70·5	3 N W	Clear
28	·683	79·0	79·2	63·8	1 N W	Clear	·770	83·5	97·0	68·8	1 N N W	Clear	·708	87·0	102·3	69·4	1 N W	Clear
29	·682	79·5	79·1	62·4	1 W	Clear	·763	87·0	98·7	69·5	0 S E	Clear	·694	87·5	103·1	72·0	2 W N W	Clear
30	·651	78·0	77·4	62·8	1 S W	Clear	·714	87·0	98·3	65·2	4 N E	Clear	·527	88·0	102·2	68·0	1 S W	Clear
Means.	28·794	78·2	78·2	63·7	.....	.....	28·855	84·4	95·2	69·7	.....	.....	28·788	85·6	100·1	71·2	.....	.....

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	Observations at 2h. 40m. P. M.						Minimum Pressure at 4 P. M.						Observations						Verandah. Per Register Instr.					
	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction from 2h. 40m.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 2h 40m. to 4 P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 4 P. M. to Sunset.	Aspect of Sky.	Max.	Min.	Max. in Sun's Ra. Per Spherical Bl. Bulb Reg. Instr.	Rain Gauge on Ground Register at 6 A. M.	Phases of the Moon.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°		
	28·916	81·0	93·2	66·3	1 N by W	Clear	28·908	81·5	92·8	65·0	1 N W	Clear	28·952	80·0	89·5	64·1	1 N W	Clear	94·2	66·5	118·0		● New
	·928	81·0	95·3	67·1	1 N W	Clear	·916	81·5	94·3	64·4	0 N W	Clear	·951	80·0	91·5	65·0	1 N W	Clear	96·3	63·8	115·0		
	·864	81·0	98·4	68·4	2 N W	Clear	·800	82·5	97·8	66·4	4 N W	Cirri	·836	81·0	92·3	69·9	1 N W	Hazy	99·2	64·6	117·5		
	·801	82·5	99·6	69·2	3 N W	Very Hazy	·764	84·0	98·4	68·7	3 N N W	Very Hazy	·771	82·5	93·4	72·9	1 N N W	Hazy	100·2	69·8	119·5		
	·758	84·5	99·7	71·5	2 N W	Cirri Haze	·719	85·0	98·3	67·4	3 N W	Cir. Haze	·762	88·0	91·5	67·4	1 W by N	Cir. Haze	100·6	73·6	119·0		
3.	·790	83·5	98·3	74·0	1 S	Slight Haze	·772	84·0	97·4	70·8	2 N	Haze	·810	83·5	91·2	68·6	1 N W	Cir.	99·3	75·8	117·0		
	·829	84·0	97·7	74·9	1 N N W	Dull Haze	·808	85·0	97·6	74·9	1 N	Dull Haze	·825	85·0	94·0	72·6	1 N N W	Dull Cum.	99·1	75·9	...		
	·832	85·0	100·4	72·5	0 W by S	Cirri	·787	85·5	99·0	70·1	1 W N W	Cir. Cum.	·822	85·5	94·4	71·3	1 N W	Cirri.	100·8	78·0	119·5		
	·783	84·5	100·4	73·2	2 N W	Cirri	·774	85·5	102·0	73·0	1 N N W	Cirri	·786	86·0	95·6	71·2	1 N W	Cirri Cum.	102·5	78·9	120·0		☽ First
	·754	85·5	100·3	73·8	1 S E	Cirri	·736	85·5	99·4	73·4	0 N W	Cirri	·761	86·0	95·1	73·7	1 N N W	Cirri.	102·3	75·8	121·5		
	·739	85·5	99·8	72·6	1 N	Hazy	·730	86·5	99·3	70·4	2 N by W	Cirri	·741	85·5	94·5	71·7	1 N W	Cir. Haze	102·4	75·8	119·5		
	·712	85·0	99·9	72·4	2 N W	Cir. Cum	·689	85·0	99·3	68·8	1 N N W	Cir. Cum.	·755	85·0	94·7	71·8	1 N W	Cir. Cum.	101·4	74·6	121·0		
3.	·718	85·5	102·2	68·4	3 N by W	Clear	·694	86·5	100·3	69·6	1 N W	Clear	·762	85·0	94·9	73·0	1 N W	Cir. Cum.	102·5	73·9	124·5		
	·783	83·5	103·3	71·6	1 S E	Cirri Cum	·758	87·0	101·9	70·8	1 N by E	Cir. Cum.	·774	87·0	96·7	74·8	1 N	Cir. Cum.	104·2	77·1	122·5		
	·754	88·0	104·3	73·0	2 N	Cirri	·702	88·0	103·5	71·0	1 N W	Cir. Cum.	·750	88·0	95·1	72·0	0 N W	Cirri	105·6	79·8	127·0		○ Full
	·721	86·0	102·5	72·1	1 S E	Cum.	·694	87·0	102·4	72·9	1 Variable	Cum.	·729	87·0	95·6	73·5	1 N N W	Cum.	104·4	77·7	130·0		
	·704	87·0	104·2	71·5	4 W N W	Lt. Cum.	·698	87·0	101·7	69·8	4 W by S	Lt. Cum.	·708	83·0	95·0	71·3	0 W	Clear.	104·0	80·8	123·0		
	·678	87·0	101·2	72·0	3 N W	Lt. Cum.	·671	88·0	100·8	69·2	4 N W	Lt. Cum.	·683	84·0	95·3	68·8	4 W	Nimbi Cum.	102·8	80·3	...		
	·785	85·0	99·8	69·2	1 S W	Cum. & Haze	·770	86·0	98·9	68·1	4 N W	Lt. Haze	·777	86·0	95·5	64·6	3 N W	Lt. Haze	102·6	81·9	...		
3.	·753	86·5	99·0	70·6	4 N	Cum.	·739	87·0	98·1	69·4	4 N W	Cumuli	·746	86·0	93·2	69·1	2 N by W	Cum.	101·2	78·6	128·0		
	·652	86·5	100·7	71·8	1 N W	Cum.	·620	87·0	98·8	72·0	2 N W	Cum.	·643	86·0	96·3	72·7	1 N N W	Cum.	102·2	78·4	125·0		
	·601	88·0	101·4	74·7	2 N by W	Cum.	* ·605	89·0	100·3	74·7	1 N	Cum.	·618	88·5	96·4	75·6	1 N by W	Cum.	102·5	79·4	128·5		
	·538	90·0	105·6	73·5	4 N W	Cum.	* ·533	92·0	104·1	72·2	4 N W	Cum.	·570	90·0	97·7	74·4	2 N W	Cum.	106·0	84·3	131·5		☾ Last
	·608	90·5	105·3	75·4	3 N W	Clear	* ·600	90·0	104·6	72·5	3 N W	Clear.	·644	90·0	100·8	75·1	1 N by W	Clear	106·9	81·7	128·0		
	·650	90·0	106·2	73·1	2 W by N	Clear	·621	89·0	105·3	73·0	2 N W	Clear.	·637	88·0	100·1	72·5	1 W	Clear	108·2	78·8	130·5		
	·516	88·5	104·1	70·6	4 N W	Clear	·497	88·5	103·3	68·9	3 N W	Clear.	·540	88·5	97·2	69·3	1 W	Clear	106·4	84·8	132·0		
3.	·568	87·0	103·4	70·5	4 N W	Clear	·559	86·5	102·3	69·4	4 N W	Clear.	·576	87·0	98·3	68·4	2 N W	Clear	105·7	84·0	130·5		
	·634	88·0	103·4	68·2	3 W	Clear	* ·634	88·0	102·0	67·8	3 W	Clear.	·648	87·5	97·9	69·4	1 W	Clear	106·4	78·2	128·5		
	·601	86·0	103·6	70·0	1 W N W	Clear	* ·603	87·0	101·8	67·2	1 N W	Clear.	·639	83·5	96·1	67·4	1 N W	Clear	106·6	78·2	130·0		
	·552	88·5	103·2	69·7	1 S W	Clear	·520	88·5	100·9	69·2	0 S E	Clear.	·544	88·5	98·5	71·0	0 N	Clear	105·0	76·8	129·5		
	28·734	85·9	101·2	71·3	.....	.....	28·697	86·4	100·2	70·0	.....	.....	28·725	85·7	95·2	70·7	.....	.....	102·7	76·9	124·3	...	.....

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Days of the Month.	Observations at Sunrise.						Maximum Pressure at 9h. 50m.						Observations at Apparent Noon.					
	Barometer uncorrected for temperature.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunset to Sun rise.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunrise to 9h. 50m.	Aspect of Sky.	Barometer uncorrected	Temperature Of the Mer.	Temperature External. D. Bulb.	Temperature External. W. Bulb.	Wind. Direction and force from 9h. 50m. to apparent noon.	Aspect of Sky.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
1	28·614	78·0	77·4	56·7	1 N E	Clear	28·718	86·0	96·5	63·7	3 E	Clear	28·672	88·5	102·2	68·1	2 N by E	Clear
2																		
3																		
4 S.																		
5																		
6																		
7																		
8																		
9		Fever.							Fever.						Fever.			
10																		
11 S.																		
12																		
13																		
14																		
15																		
16	·754	88·0	86·8	69·6	1 W	Cirri	·821	90·0	97·7	71·4	3 N by W	Cir. Cum.	·752	91·0	101·7	74·5	2 N by W	Cirri
17	·731	87·0	84·4	69·2	1 W	Cirri	·798	90·0	99·3	72·2	1 N W	Cir. Haze	·732	91·0	103·2	73·4	1 N E	Cir. Haze
18 S.	·684	86·5	86·5	69·1	1 W	Clear	·776	91·0	100·3	72·8	2 N W	Clear	·681	91·5	102·8	72·9	2 N W	Clear
19	·698	87·0	87·3	67·7	1 N by W	Clear	·779	91·0	100·6	72·2	2 N W	Clear	·682	91·5	102·6	72·4	1 N W	Clear
20	·683	87·0	86·9	67·5	1 N W	Clear	·734	91·5	101·8	74·8	2 N W	Clear	·728	92·5	103·4	73·8	1 W	Clear
21	·701	88·0	89.0	66·4	1 W by N	Clear	·778	92·0	100·9	74·2	2 N W	Clear	·707	92·5	105·1	76·8	2 N W	Clear
22	·682	89·5	91·2	70·6	1 N W	Clear	·719	92·5	101·4	75·7	3 W by N	Clear	·668	93·0	105·3	77·2	2 N W	Clear
23	·686	90·6	89.8	70·3	1 W by N	Clear	·738	93·0	102·0	77·1	2 N by W	Clear	·677	91·5	104·2	76·3	3 W	Clear
24	·698	88·5	89·7	70·6	1 W	Clear	·762	93·0	102·4	77·1	1 N W	Clear	·683	93·0	104·5	76·4	2 N W	Clear
25 S.	·706	89·0	91·2	73·5	1 W	Clear	·785	93·5	102·2	78·3	0 N W	Cirri and Hazy	·702	94·5	105·4	79·5	1 W S W	Cir. Haze
26	·764	89·0	90·5	74·2	1 E N E	Cum	·803	92·5	101·3	76·3	1 N E	Dull Cum.	·754	93·0	...	...	...	...
27																		
28																		
29		Fever.							Fever.						Fever.			
30																		
31																		
Means.	28·701	87·3	87·5	68·7	.....	.....	28·767	91·4	100·5	73·8	.....	.....	28·703	91·9	103·6	74·6	.....	.....

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Days of the month.	Observations at 2h. 40m. P. M. Barometer uncorrected.	Temperature: Of the Mer.	Temperature: External. D. Bulb	Temperature: External. W. Bulb.	Wind. Direction and force from apparent noon to 2h. 40m.	Aspect of Sky.	Minimum Pressure at 4 A. M. Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb	Temperature. External. W. Bulb.	Wind. Direction and force from 2h. 40m. to 4 P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature: Of the Mer.	Temperature: External. D. Bulb.	Temperature: External. W. Bulb.	Wind. Direction and force from 4 P. M. to Sunset.	Aspect of Sky.	Verandah. Per Register Instr. Max.	Verandah. Per Register Instr. Min.	Max. in Sun's Ray Per Spherical Bla Bulb Reg. Instr.	Rain Gauge on Ground, registere at 8 A. M.	Phases of the Mo
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
	28·603	89·0	104·2	70·1	1 N E	Clear	28·572	89·5	103·3	71·6	1 W S W	Clear	28·603	88·5	97·2	67·0	1 N by E	Cirri	105·9	75·7	122·5	...	
							·596	90·0	104·0	67·9	3 N	Hazy Cirri	·615	89·5	100·0	69·2	2 N	Hazy Cirri	106 2	78·8	123·0	...	
													·621	89·0	100·1	69·4	1 N	Hazy Cirri	106·8	76·9	122·0	...	
S.													·619	88·5	100·2	65·6	1 N	Cir. Cum.	107·2	79·4	126·5	...	
													·632	89·0	100·8	71·2	1 N	Cir. Cum.	107·8	79·1	128·5	...	
																						...	
																						...	
																						·148	☽ First
			Fever.						Fever.						Fever.							...	
S.																						...	
																						...	
																						...	
																						...	
																						...	
																						...	○
	·697	90·5	102·3	74·4	3 S W	Cum.	·682	91·0	104·6	71·4	2 S W	Cirri	·734	91·5	97·7	72·4	1 W by N	Cum.	106·8	81·0	130·0	...	
	·684	91·0	104·1	73·6	2 N	Cir. Haze	·666	92·0	105·2	71·2	1 N by W	Cir. Haze	·734	91·5	99·3	72·6	1 N W	Cir. Haze	107·2	85·0	...	...	
S.	·637	92·5	104·4	72·8	2 N W	Clear	·622	93·5	105·6	69·8	2 N W	Clear	·659	93·5	99·9	72·0	1 N W	Clear	108·4	84·6	129·0	...	
	·642	92·0	105·1	72·6	3 N W	Clear	·640	93·0	105·5	68·7	1 N W	Clear	·663	93·0	100·2	70·9	1 N W	Clear	107·2	84·9	130·5	...	
	·651	93·0	105·5	74·9	2 N W	Clear	·630	93·5	105·3	74·6	3 N W	Clear	·652	93·0	100·4	75·3	1 W N W	Clear	107·8	84·6	132·0	...	
	·636	93·0	106·2	76·7	2 N by W	Clear	·622	93·5	105·9	75·8	1 W	Clear	·645	93·0	101·4	75·9	1 W	Clear	106·9	83·4	130·5	...	
	·588	93·0	106·3	76·5	1 W	Clear	·551	93·5	105·7	75·4	1 W	Clear	·578	93·0	101·9	76·1	1 W	Clear	107·0	90·6	130·5	...	
	·612	93·0	104·4	75·4	2 N by W	Clear	·575	93·5	104·0	74·6	2 N W	Clear	·638	91·5	100·3	75·7	1 N W	Clear	105·8	91·8	134·5	...	☾ Last.
	·637	94·5	105·2	77·3	1 N	Cum.	·590	95·0	104·3	76·4	0 N W	Cum.	·613	92·0	100·1	75·0	0 N W	Cum.	106·1	91·9	136·0	...	
S.	·644	95·0	105·8	79·3	1 N E	Cum. Haze	·582	94·5	104·5	78·6	1 N E	Cum. Haze	·612	93·0	100·4	77·3	1 N E	Haze Cum.	107·1	90·8	...	...	
	...	...	...	...	...	...	...	...	...	...	...	...	·595	93·0	98·9	75·9	0 S E	Cum.	103·4	87·0	130·5	...	
																			102 6	88·2	127·0	...	
																			102·4	88·4	128·0	·168	
			Fever.						Fever.						Fever.				101.0	87·2	119·5	...	
																			101 4	86·8	117·0	...	● New.
																			102·6	87·3	120·5	...	
ans	28·648	92·4	104·8	74·8	.....	.....	28·610	92·7	104·8	73·0	.....	.....	28·638	91·4	99·9	72·6	.....	.....	105·6	84·9	127·2	...	...

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e Meteorological Observations, June, 1851.—*Lat.* 22° 56′ 59.8″ *N.*—*Long.* 79° 18′ 00″ *E.*—*Var.* 1° 43′ 20″—*Dip.* 25° 17′.

Days of the month.	Observations at Sunrise. Barometer uncorrected for temperature.	Temperature. Of the Mer.	External. D. Bulb.	External. W. Bulb.	Wind. Direction and force from Sunset to Sunrise.	Aspect of Sky.	Maximum Pressure at 9h. 50m. A. M. Barometer uncorrected.	Temperature. Of the Mer.	External. D. Bulb.	External. W. Bulb.	Wind. Direction and force from Sunrise to 9h. 50m.	Aspect of Sky.	Observations at Apparent Noon. Barometer uncorrected.	Temperature. Of the Mer.	External. D. Bulb.	External. W. Bulb.	Wind. Direction and force from 9h. 50m. to apparent noon.	Aspect of Sky.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
1 S.	28·613	89·5	90·8	74·0	1 W	Cum.	28·374	92·5	98·1	77·6	3 W	Cum.	28·582	92·5	99·2	78·8	3 W	Cum.
2	·602	90·0	90·9	73·8	2 W	Cum. Str.	·356	93·0	97·4	77·5	4 N W	Haze Cum.	·615	93·0	99·4	78·4	3 N W	Hazy Cum.
3	·618	89·0	89·1	70·4	2 W N W	Cirri	·372	92·0	97·8	76·3	4 N W	Cirri	·615	93·0	101·6	77·2	4 N by W	Cirri
4	·301	90·0	90·8	71·8	2 W	Cirri	·654	93·5	99·3	77·4	4 N W	Cum.	·598	94·0	101·6	78·1	3 N by W	Cum.
5	·596	90·0	89·8	71·7	0 W	Cum. Strat	·636	93·0	100·5	75·4	3 N N W	Cum.	·584	93·0	100·2	75·5	3 N N W	Overct. Cum.
6	·588	89·5	90·1	72·6	0 W	Cir. Str.	·631	93·0	99·3	76·2	3 N N W	Cirri	·578	94·0	101·8	77·0	4 N W	Cirri
7	·585	91·0	92·0	75·2	1 W	Cum.	·614	94·0	99·9	79·9	3 N W	Cum.	·551	94·5	101·5	80·2	2 W by N	Cum.
8 S.	·568	89·5	90·9	73·6	1 S E	Dark Cum.	·300	93·5	99·4	81·2	5 S	Dark Cum.	·544	94·0	103·2	80·6	2 N W	Cum.
9	·578	84·0	85·2	78·1	1 S W	Cum.	·613	87·0	88·5	77·9	2 N W	Lt. Cum.	·578	92·3	94·4	78·5	2 S by W	Lt. Cirri
10	·511	87·5	87·3	79·3	1 W	Cum. Str.	·547	93·0	92·3	78·4	3 N W	Cum.	·461	95·0	96·0	78·3	4 W	Cum.
11	·442	86·0	84·9	79·7	0 W	Cum.	·518	89·0	90·3	81·1	1 N W	Lt. Cum.	·473	89·0	95·3	79·8	3 N W	Dark Cum.
12	·518	84·5	84·3	79·0	0 S W	Cum.	·610	88·0	89·2	81·4	0 S W	Cum.	·582	93·5	91·7	80·1	2 W	Cum.
13	·531	84·0	85·5	78·2	0 S W	Diffused Cum.	·594	88·5	90·3	78·0	2 N W	Cum.	·550	93·0	94·4	77·8	3 N W	Cum.
14	·522	80·0	82·2	76·2	0 W S W	Overcast Cum.	·565	82·0	83·3	75·5	3 W S W	Overcast Cum.	·546	82·5	83·9	75·4	3 W S W	Overct. Difd. Cum.
15 S.	·563	80·0	82·4	76·3	0 W by S	Diffused Cum.	·623	82·0	82·7	75·4	3 W	Dull Diffused Cum.	·592	83·0	84·7	76·2	4 W	Dull Diffused Cum.
16	·642	82·0	80·8	75·9	1 W S W	Dull Overcast.	·732	84·0	84·5	77·0	3 W by N	Overcast Cum.	·712	85·5	86·4	77·1	3 N W	Overcast Cum.
17	·373	84·0	84·3	77·2	1 W	Diffused Cum.	·692	87·5	88·8	77·1	4 W N W	Fair & Cum.	·687	89·5	90·8	77·3	3 W by S	Fair & Cum.
18	·332	83·5	83·6	73·5	1 W S W	Lt. Cum.	·663	87·5	89·3	75·4	4 N W	Fair	·658	88·5	91·0	75·8	5 N W	Fair & Cum.
19	·676	83·5	84·2	73·8	1 W	Clear	·727	87·0	88·8	76·3	4 N W	Clear	·684	90·0	92·8	78·2	4 W N W	Clear
20	·726	83·0	86·3	76·4	1 W N W	Cirri	·776	91·5	90·8	77·5	3 W	Cum.	·721	92·5	94·3	79·2	3 W	Heavy White Cum.
21	·724	87·5	88·6	78·0	0 S E	Dull Cum. Str.	·778	89·5	91·3	78·5	0 N E	Dull Cum.	·758	94·0	94·8	78·6	0 W	Fair & Cum.
22 S.	·803	82·5	80·1	73·2	1 N N E	Ragged Cum.	·791	83·0	84·2	75·7	1 N	Dull Cum.	·756	87·0	88·4	76·7	2 N W	Fair & Cum.
23	·749	85·0	85·5	76·6	1 W	Cir. Str.	·762	89·5	91·3	76·9	2 N N E	Fair	·517	94·0	95·5	76·4	4 N E	Cum.
24	·635	83·0	87·1	78·3	0 W by S	Lt. Cir.	·674	91·5	92·2	77·4	1 W by S	Clear	·652	96·0	98·4	75·3	2 W N W	Cirri
25	·570	88·5	89·4	78·6	0 W by N	Cum.	·343	93·0	94·4	76·8	2 W N W	Clear	·599	98·0	97·5	77·1	3 N W	Fair
26	·605	83·0	83·6	73·4	0 W	Cirri	·638	92·0	94·0	77·5	4 N W	Clear	·602	96·5	97·8	78·5	4 N W	Clear
27	·576	87·5	89·0	75·3	1 W N W	Dull Diffused Cum.	·628	92·5	93·4	77·1	4 W N W	Hazy	·598	95·5	96·8	79·2	5 N W	Fair & Hazy
28	·569	82·5	82·8	75·6	1 N W	Overcast	·661	83·5	85·8	77·1	0 N W	Overcast	·612	89·5	89·4	76·7	2 N W	Dull
29 S.	·533	81·0	81·3	75·9	0 S by W	Overcast	·618	82·5	82·4	76·1	0 S	Overcast	·633	86·0	86·5	76·8	1 S by W	Overcast
30	·654	86·0	83·8	77·7	1 N W	Overcast	·684	90·0	90·2	78·3	2 W by N	Fair	·664	94·0	94·4	78·5	3 W N W	Fair
Means.	28·606	85·8	86·3	75·6	.....	.....	28·656	89·3	91·6	77·4	.....	.....	28·616	91·7	91·7	77·4	.....	.....

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NURSINGPORE OBSERVATIONS.

Observations at 2h. 40m. P. M.						Minimum Pressure at 4 P. M.												Verandah. Per Register Instr.				
Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from apparent Noon to 2·40 P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 2·40 to 4 P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 4 P. M. to Sunset.	Aspect of Sky.	Max.	Min.	Max. in Sun's Ray. Per Spherical Bla Bulb Reg. Instr.	Rain Gauge on Ground, registered at 6 A. M.	Phases of the Moon.
Inches.	°	°	°			Inches.	°	°	°			Inches	°	°	°			°	°	°	Inches.	
28·530	94·0	100·8	79·4	2 W	Cum.	28·505	93·5	99·7	78·5	3 W	Cum.	28·551	92·0	97·2	78·3	3 W	Cum.	102·6	89·9	...	...	
·562	94·0	102·0	79·0	4 N W	Hazy Cum.	·539	94·0	101·6	78·9	2 N W	Hazy Cum.	·574	92·5	98·4	72·3	2 N by W	Overcast	102·9	88·4	...	...	
·547	94·0	103·3	78·2	3 W N W	Cum.	·512	94·0	103·1	78·7	1 W N W	Hazy Cum.	·542	93·0	98·2	72·7	3 N by W	Cum.	105·1	90·2	129·0	...	
·538	94·0	102·9	78·0	2 W	Hazy Cum.	·507	94·0	101·4	77·8	1 N N W	Cumuli	·550	93·0	96·8	78·4	0 E	Overct. Lt. Rain	104·1	90·1	...	...	
·523	94·0	103·4	77·0	2 N W	Cum.	·484	94·0	102·5	76·7	1 N W	Cum.	·515	93·0	99·8	77·4	1 N W	Cir. Str.	104·8	89·3	...	...	
·529	94·5	103·4	77·9	2 W	Cum.	·500	95·0	102·4	77·6	2 N W	Cum.	·521	94·5	99·8	76·4	2 N W	Cum.	104·1	89·2	126·5	...	☽ First
·499	94·5	102·8	79·8	1 N W	Cum.	·462	95·5	103·7	79·5	3 N N W	Cum.	·498	95·0	99·9	79·7	1 N W	Cum.	102·8	92·0	..	...	
·473	94·5	104·3	81·4	1 S W	Cum.	·412	94·0	98·4	80·0	1 S W	Overct. Cum.	·511	88·5	92·1	81·0	1 S W	Overct. Nimbi	105·1	90·9	...	...	
·534	92·5	97·1	78·6	2 W	Lt. Cirri	·470	93·0	98·0	78·3	2 W	Lt. Cirri	·496	91·5	92·3	79·9	2 W	Dark Cum.	98·2	83·6	...	·278	
·415	90·0	83·8	76·3	3 W S W	Dark Cum.	·382	85·0	83·1	74·3	4 W S W	Overcast	·424	84·5	85·3	79·4	0 S W	Raining	98·8	84·7	...	...	
·444	88·0	89·9	78·9	5 S E	Overct. Threat.	·391	87·5	85·4	78·7	3 N W	Dull Overcast	·477	85·0	86·4	79·3	1 N W	Raining	95·4	80·0	...	·290	
·496	94·5	95·0	80·2	2 S W	Cum.	·448	93·0	93·1	79·0	1 S E	Cum.	·470	90·5	89·5	77·1	1 S by W	Cum.	95·8	80·7	...	·049	
·465	95·5	96·9	77·5	4 N W	Cum.	·423	94·0	95·4	77·9	3 S W	Dull Cum.	·461	88·5	88·6	77·2	2 S by W	Overct. Cum.	96·9	81·6	...	...	○ Full.
·504	85·0	85·8	76·5	3 W	Cum.	·462	86·0	85·7	76·0	2 W	Cum.	·501	85·0	84·8	66·2	2 W	Cum.	87·3	80·4	...	·012	
·557	84·0	86·1	76·9	3 W	Dull Cum	·538	85·0	86·2	77·3	3 W	Diffused Cum.	·580	82·5	83·4	76·9	2 W	Dark Cum.	87·6	79·2	...	·027	
·650	87·0	87·6	76·4	3 N W	Overct. Cum.	·617	86·5	87·7	77·0	4 W N W	Overct. Cum.	·649	86·5	87·1	77·4	1 W	Overcast Cum.	87·8	78·8	...	·191	
·636	92·0	92·8	77·6	4 S W	Fair and Cum.	·618	92·5	92·5	77·7	5 W	Cum.	...	Duty	Duty	...	1 W	Lt. Cum.	92·7	81·8	128·5	...	
·597	90·5	93·2	76·7	5 N W	Fair and Cum.	·590	91·0	93·2	77·2	5 N W	Fair and Cum.	·611	87·0	90·1	78·8	3 N W	Cum.	93·4	82·1	131·0	...	
·637	92·0	95·2	78·0	4 W by N	Clear	·640	92·0	95·3	77·2	2 N N W	Clear	·662	91·5	92·7	76·4	2 N N W	Cirri	95·6	82·8	130·0	...	
·682	94·5	96·1	79·5	3 W N W	Cum.	·617	94·5	96·8	79·8	2 W	Fr. & Lt. Cum.	·639	93·0	94·5	78·3	3 N W	Fair	97·1	84·8	...	...	
·634	94·5	98·3	75·8	3 N W	Fair and Cum.	·635	94·5	97·8	78·2	2 N W	Fair and Cum.	·671	93·5	91·4	75·6	4 N E	Cloudy Stormy	97·3	84·2	124·0	...	☾ Last.
·708	92·5	92·8	75·6	3 N W	Fair and Cum	·694	95·0	92·9	74·6	2 N by E	Hazy Cum.	·733	90·0	90·3	73·2	3 N	Fair and Cum.	93·4	75·8	125·5	...	
·637	96·5	99·1	73·9	5 N E	Fair and Cum.	·609	96·0	97·8	73·4	4 N E	Fair and Cum.	·630	94·5	94·1	75·2	3 N	Fair and Cum.	99·2	83·5	123·0	...	
·560	95·5	96·3	75·5	1 E by N	Diffused Cum.	·541	95·0	97·4	77·1	1 S E	Dull Cum.	...	Duty	Duty	...	.....	.....	99·6	85·3	...	...	
·535	100·0	100·2	76·7	3 N W	Cum.	·498	95·5	99·7	76·5	3 N W	Cum.	·527	94·5	97·4	75·6	2 N W	Cum.	100·6	88·2	130·5	·067	
·534	101·0	100·9	77·6	4 N W	Cum.	·503	101·0	100·8	77·9	4 N W	Cum.	·530	96·5	96·3	77·8	0 N W	Overcast Cum.	102·8	86·1	127·0	...	
·534	99·0	99·3	79·2	4 N W	Hazy and Fair	·500	99·0	99·0	79·4	4 N W	Hazy and Fair	·578	81·0	83·7	76·0	2 N W	Raining	99·2	88·3	129·5	...	
·585	93·0	93·1	77·8	3 W N W	Fair and Hazy	·546	93·0	92·8	77·8	2 N N W	Fair	·587	88·5	89·3	77·6	2 N N W	Overcast Dull	92·3	79·8	..	·264	
·601	88·0	88·2	76·0	1 S	Overct. Cum.	·584	89·5	88·5	76·9	1 S by E	Overcast	·596	87·0	87·3	76·9	0 S by E	Overcast	89·7	80·2	...	·129	● New.
·532	92·5	86·7	77·9	1 N	Raining	·519	83·5	81·7	76·6	2 S	Raining	·574	83·0	80·5	75·9	1 S W	Raining	96·2	83·4	...	...	
28·557	93·0	96·0	77·6	.....	.....	28·524	92·5	95·1	77·4	.....	.....	28·559	89·8	91·6	77·0	.....	.....	97·6	84·5	127·6	1·307	.....

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ore Meteorological Observations, July, 1851.—*Lat.* 22° 56′ 59″·8 *N.*—*Long.* 79° 18′ 00″ *E.*—*Var.* 1° 43′ 28″ —*Dip.* 25° 17′.

Days of the Month.	Observations at Sunrise. Barometer uncorrected for temperature.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunset to Sunrise.	Aspect of Sky.	Maximum Pressure at 9h. 50m. A. M. Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunrise to 9h. 50m.	Aspect of Sky.	Observations at Apparent Noon. Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from force 9h. 50m. to apparent noon.	Aspect of Sky.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
1	28·628	81·0	79·8	75·3	1 W by S	Overct.	28·671	85·5	85·9	77·3	3 W N W	Fair and Lt. Cum.	28·632	83·0	89·3	79·1	2 S W	Fair
2	·613	83·0	79·2	76·8	0 W S W	Overct.	·670	83·0	86·4	76·7	3 W by N	Fair Cum.	·648	88·0	88·7	78·2	3 N W	Cum.
3	·611	80·0	79·8	74·3	1 W by S	Cum.	·654	86·5	87·6	77·9	2 S	Fair Cum.	·627	89·0	90·2	78·4	1 N W	Fair Cum.
4	·630	83·0	79·8	76·7	0 N W	Overct.	·666	86·0	87·3	77·6	0 S	Fair	·622	88·5	89·2	79·0	1 N W	Fair Cum.
5	·628	81·5	79·6	75·5	0 N W	Overct.	·662	82·5	82·8	78·4	2 N N W	Dull	·611	85·5	86·7	78·5	1 N N W	Overct.
6 S.	·667	81·0	77·8	74·9	0 N W	Dull Overct.	·708	82·5	82·7	76·9	0 N W	Dull Overct.	·683	83·0	85·4	78·4	0 S E	Fair and Cum.
7	·731	80·0	78·8	75·0	0 S E	Fair Cum. Str.	·754	84·5	85·6	76·5	0 S by E	Fair Cirri	·398	87·5	88·8	76·8	1 S by W	Fair White Cum.
8	·664	82·5	80·3	77·2	0 W	Cum.	·693	86·0	86·4	78·3	3 W	Cum.	·650	89·0	89·7	77·9	0 N W	Fair and Cum.
9	·545	84·5	82·3	75·7	0 N W	Cir. Str.	·627	86·0	86·9	77·1	2 N W	Cum.	·309	83·5	84·1	76·8	3 S E	Raining
10	·616	81·0	77·7	75·2	0 S S E	Cum. Str.	·648	84·5	85·8	78·0	1 S by E	Cum. and Fair	·632	82·5	81·7	77·1	1 S S E	Raining
11	·601	80·5	80·0	76·1	0 E	Cum.	·628	84·0	84·7	78·1	1 S E	Cum.	·584	86·5	87·8	78·4	2 S E	Fair and Cum.
12	·568	81·0	80·1	76·3	0 W N W	Cum.	·613	84·5	85·4	77·1	1 W N W	Cum.	·592	86·0	86·8	78·0	1 W by N	Overct. Cum.
13 S.	·564	79·0	77·4	74·6	0 N N W	Cum.	·620	82·0	82·3	77·5	2 N W	Cum.	·604	85·0	85·9	78·5	2 W	Fair and Cum.
14	·551	82·5	81·3	77·4	1 N W	Cum. Strat.	·604	84·0	84·3	78·5	1 N W	Overct.	·553	83·5	84·2	79·4	2 W N W	Raining
15	·520	79·0	75·3	73·4	1 E N E	Cum.	·572	81·5	81·7	77·4	1 N W	Overct. Cum.	·529	84·5	85·2	79·5	1 W	Fair and Cum.
16	·546	81·0	79·9	77·3	0 N W	Dull Overct.	·579	82·5	84·1	79·0	1 W N W	Dull Overct.	·522	85·5	86·8	79·5	1 N W	Fair and Cum.
17	·504	80·0	79·3	75·8	0 N W	Cum.	·535	82·0	82·5	77·5	1 N W	Cum.	·473	83·0	83·1	77·8	2 S E	Overct. Threatened.
18	·453	80·0	77·0	75·7	0 N W	Mist.	·470	83·0	83·2	79·3	1 N E	Overct.	·424	85·0	86·0	79·9	2 N by E	Fair and Cum.
19	·488	80·5	80·0	77·5	0 N W	Dull Overct.	·537	83·5	84·5	79·2	1 S E	Dull Overct.	·510	86·5	88·3	80·3	2 N by W	Fair and Cum.
20 S.	·568	80·5	78·3	76·2	1 N W	Dull Cum.	·600	81·0	80·3	77·3	1 W N W	Dull Cum.	·584	82·0	81·8	78·5	2 N W	Lt. Rain
21	·617	78·0	76·6	73·8	2 W	Cum.	·681	83·0	80·7	76·2	4 W	Cum.	·319	83·5	82·1	76·9	4 W by N	Fair and Cum.
22	·300	78·0	77·5	73·4	3 W S W	Dull Overct.	·676	77·5	77·6	74·5	4 W	Overct.	·350	80·5	80·5	74·5	4 W by N	Overct.
23	·562	77·0	75·9	73·1	2 W	Dull Overct.	·618	77·5	77·3	73·7	4 W	Drizzling Rain	·588	77·5	77·4	73·4	4 W by S	Drizzling Rain.
24	·542	77·0	73·4	72·5	0 S W	Steady Rain.	·594	77·0	73·6	75·3	4 S W	Rain	·561	78·0	77·2	74·2	5 W	Dull
25	·549	75·5	74·8	73·0	1 W by S	Dull Overct.	·588	78·5	79·0	75·1	2 W S W	Diffd. Cum.	·570	80·5	81·5	76·5	3 W	Fair and Cum.
26	·568	78·0	75·5	74·7	1 W	Cum.	·597	80·5	81·3	76·4	2 W	Fair and Cum.	·561	83·0	83·9	77·8	2 W	Fair and Cum.
27 S.	·601	79·0	77·2	75·4	1 W N W	Dull Overct.	·639	81·0	82·5	77·5	1 N W	Fair and Cum.	·592	82·0	84·2	78·4	1 N by W	Fair & Heavy Cum
28	·597	79·0	77·8	76·5	0 N E	Diffd. Cum.	·642	82·5	84·1	78·7	1 N	Fair and Cum.	·590	85·0	86·9	78·8	1 E by N	Fair and Cum.
29	·612	80·5	77·3	76·2	0 E	Fair and Cum. Str.	·659	82·5	84·1	78·9	0 E	Fair and Cum.	·588	85·0	87·4	80·3	1 S E	Fair and Cum.
30	·588	79·5	78·6	76·4	0 N W	Cirro Stratus	·630	84·5	85·3	79·1	1 S E	Fair and Cum.	·594	86·5	87·7	78·7	2 S E	Fair and Cum.
31	·572	79·0	78·3	75·7	0 S E	Fair and Cirri	·306	83·5	85·8	79·2	0 E	Fair and Cum.	·520	85·5	86·8	78·4	2 S E	Fair and Cum.
Means.	28·584	80·0	78·3	75·0	.....	.....	28·627	82·7	83·3	77·4	.....	.....	28·587	84·5	85·3	77·9	.....	.....

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OBSERVATIONS AT 20, 40m. P. M.

Days of the Month.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from apparent noon to 2h. 40m. P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 2h. 40m. to 4 P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 4 P. M. to Sunset.	Aspect of Sky.	Register Thermer. Max.	Register Thermer. Min.	Max. in Sun's R Per Spherical B Bulb Regr. In	Rain Gauge Ground, Registe at 6 A. M.	Phases of th Moon.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
1	28·594	84·0	82·4	75·8	6 N by W	Dark threatg.	28·571	81·5	76·6	74·3	3 N	Raining	28·599	80·5	82·0	77·1	2 S W	Overct.	92·5	80·4	...	·634	
2	·607	86·0	86·2	78·3	2 S	Overct.	·566	87·0	86·8	79·4	2 S S W	Overct.	·585	86·0	85·4	78·1	0 S	Fair and Cum.	89·2	77·2	...	·187	
3	·564	85·0	85·3	76·4	2 S	Overct.	·555	86·0	86·0	77·9	4 S	Overct.	·602	84·5	84·3	77·8	1 S	Overct.	90·6	78·5	...	1·470	
4	·564	92·0	92·3	78·1	2 N W	Fair and Cum.	·516	91·5	91·6	77·5	1 N W	Fair and Cum.	·561	86·0	84·4	74·5	2 N W	Fair and Cum.	91·8	79·4	...	·154	
5	·553	85·0	85·7	78·4	3 W by N	Dull threatg.	·538	82·5	81·6	77·7	1 S	Raining	·618	78·5	78·1	74·8	2 N N W	H.R. Tdr.& Lt.	88·8	80·2	...	·114	☽ First
6 S.	·637	85·0	85·9	78·7	0 S	Dull Cum.	·600	87·0	87·2	78·5	1 S by E	Fair and Cum.	·654	84·5	84·2	75·1	2 S E	Fair and Cum.	87·4	78·2	...	1·622	
7	·656	88·5	96·2	77·3	1 S by W	Fair	·645	88·0	88·6	77·3	0 S	Cum.	·663	86·5	86·1	78·2	0 W N W	Fair and Cum.	90·7	79·3	119·0	·129	
8	·576	91·0	91·3	77·2	4 W N W	Fair and Cum.	·544	91·5	91·6	76·9	2 N W	Fair and Cum.	·580	88·0	88·4	76·9	1 N W	Fair and Cum.	91·5	82·1	113·5	...	
9	·589	83·0	80·2	76·8	1 S W	Cum.	·546	83·0	83·5	78·1	1 N N W	Cum.	·561	83·0	83·2	78·5	0 S by E	Overct.	86·9	83·0	...	...	
10	·570	80·0	79·8	76·6	1 S E	Raining	·561	81·5	82·3	78·2	0 N W	Cum.	·582	80·5	83·1	77·6	0 N W	Cum.	87·0	77·5	...	·490	
11	·532	88·2	88·8	77·4	2 S E	Cum. and Fair	·501	89·0	88·9	77·3	2 S E	Fair and Cum.	·533	85·5	84·6	77·2	1 N by W	Cum.	89·1	80·4	...	·752	
12	·503	87·5	88·5	78·8	2 N N W	Thrtg.& Thun.	·492	82·0	80·8	76·7	3 W S W	Raining	·507	82·5	82·7	79·1	1 N W	Dull Overct	89·1	80·9	...	...	
13 S.	·541	88·5	88·8	77·9	3 W by N	Fair and Cum.	·514	89·0	88·8	77·6	3 W by N	Fair and Cum.	·524	88·0	87·1	77·2	1 N W	Hazy Cum. Str.	89·2	77·2	...	·571	○ Full.
14	·539	84·0	83·1	78·3	1 W N W	Dull Overct.	·496	82·0	81·8	77·2	1 S E	Overct.	·513	81·0	80·0	76·4	0 E S E	Overct.	88·2	83·2	...	...	
15	·447	86·0	86·3	78·7	1 W	Fair and Cum.	·432	85·5	86·2	78·5	1 W	F.& DarkCum.	·477	85·0	84·4	77·5	1 W by S	Fair and Cum.	86·9	74·1	...	2·111	
16	·486	88·0	88·3	78·9	1 S W	Fair and Cum.	·451	85·5	84·8	78·7	1 S E	Raining	·478	83·0	82·9	79·7	0 N by E	Fair and Cum.	87·8	80·0	...	...	
17	·412	82·5	82·0	78·5	3 W by N	Fair and Cum.	·382	82·5	81·4	78·9	1 W by S	Raining	·392	79·5	79·3	77·3	3 W N W	Raining	85·9	79·2	...	·074	
18	·371	84·0	85·2	79·4	2 E S E	Raining	·343	83·0	82·3	78·5	3 E by N	Cum.	·367	80·5	80·2	77·8	2 S E	Raining	87·2	78·1	...	3·432	
19	·436	88·0	90·4	80·1	3 N E	Fair and Cum.	·420	89·5	91·6	79·5	3 E N E	Fair and Cum.	·461	83·0	82·9	77·8	3 W by N	Fair and Cum.	91·6	79·4	...	·548	
20 S.	·518	81·0	81·1	76·7	0 S W	Overct. Dull	·497	87·0	77·6	75·2	2 S W	Raining	·518	78·5	77·0	74·5	1 N W	Dull Overct.	83·6	77·8	...	1·738	☾ Last.
21	·592	85·0	85·2	77·3	4 N W	Fair and Cum.	·548	85·5	85·6	78·3	4 W by S	F. and Cumul	·602	82·5	82·1	76·3	3 W	Fair and Cum.	85·4	76·2	...	·264	
22	·562	82·5	82·1	75·4	5 S W	Overct.	·540	82·5	82·2	74·3	5 W	Overct.	·565	80·0	79·1	74·8	3 W S W	Overct.	82·7	77·3	...	...	
23	·537	77·0	76·3	74·4	4 W	Drizzling Rain	·521	77·0	76·3	73·7	4 W	Overct. Dismal	·554	86·0	74·9	72·9	5 W N W	Drizzling Rain	78·2	76·2	...	·020	
24	·520	78·5	77·5	74·1	5 W	Dull	·512	78·0	77·4	74·1	5 W	Dull Overct.	·543	76·5	74·7	72·4	3 W	Dull	77·8	73·3	...	1·541	
25	·519	81·5	82·0	77·2	3 W S W	Fair and Cum.	·496	83·0	83·3	76·7	2 W	Fair and Cum.	·510	79·5	78·9	76·0	1 S W	Fair and Cum.	84·5	73·4	...	...	
26	·535	81·5	81·3	77·3	1 W	Overct. Thun.	·484	82·5	83·0	77·6	1 W	Cum.	·512	81·5	81·5	78·4	1 W	Dark Cum.	84·7	76·8	...	...	
27 S.	·534	83·5	83·6	78·4	2 N W	Dull Overct.	·515	82·0	82·1	78·8	2 N W	Rain & Thun.	·542	81·0	80·5	77·8	0 N	Dull Overct.	86·4	77·7	...	·110	● New.
28	·551	86·0	89·1	80·1	1 N N E	Fair and Cum.	·536	84·5	83·9	78·5	2 Variabe.	H. R. & Thun.	·549	81·0	81·2	77·3	1 S	Dull Overct.	90·0	77·6	...	·061	
29	·526	87·0	88·0	78·7	1 S E	Fair and Cum.	·493	87·0	89·0	78·1	2 E by S	Fair and Cum.	·533	81·5	85·9	78·1	2 S E	Dull	90·4	77·4	...	·118	
30	·523	88·0	89·0	79·2	1 S E	Fair and Cum.	·486	85·5	83·4	77·8	2 S E	Thun. Cloudy.	·522	81·0	80·3	75·8	1 S E	Overct.	90·2	79·2	...	·530	
31	·495	86·5	86·6	79·1	2 S W	F.&Hzy. Cum.	·466	86·0	86·3	78·5	2 S W	F. & Dk. Cum.	·489	80·5	81·9	78·0	2 S W	Raining	89·0	78·3	...	·002	
Mn.	28·535	84·9	85·2	77·7	.....	.....	28·508	84·7	84·3	77·6	.....	.....	28·538	82·1	81·9	76·8	.....	.....	87·5	78·6	116·2	17·672	.....

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Days of the Month	Barometer uncorrected for temperature.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunset to Sunrise.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunrise to 9h. 50m.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 9h. 50m. to apparent noon.	Aspect of Sky.
													OBSERVATIONS AT APPARENT NOON.					
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
1	28·530	78·5	78·0	74·8	1 N W	Fair and Cum. Str.	28·572	81·0	81·6	76·9	2 N W	Fair and Diff. Cum.	28·535	82·5	84·1	78·7	1 N N W	Fair & Diffd. Cum.
2	·581	78·5	78·1	75·0	1 W	Overcast Dull	·628	80·0	80·3	67·8	2 W by N	Overcast Dull	·581	83·0	82·3	78·1	2 W by N	Fair and Cum.
3 S.	·634	78·0	77·5	74·2	1 W	Overcast Dull	·684	80·5	80·6	75·5	3 W	Cum.	·638	82·5	82·3	76·1	3 N W	Cum.
4	·597	78·0	77·7	74·1	2 N W	Overcast	·357	78·0	78 2	74·4	3 W N W	Dull Overcast	·616	79·0	78·7	75·8	2 W	Raining
5	·541	77·5	77·1	75·3	1 W by N	Overct. Driz. Rain	·594	77·5	77·4	75·7	3 W by N	Raining Heavily	·564	78·0	77·9	75·9	4 W N W	Drizzling Rain
6	·564	77·5	76·8	74·7	1 W	Overcast	·626	79·0	79·2	75·7	3 N W	Overcast	·601	80·5	80·7	76·8	3 N W	Overcast Cum.
7	·627	79·0	76·0	73·1	3 N W	Overcast	·681	78·0	78·2	74·6	4 W N W	Overcast	·666	78·5	78·9	75·8	3 N W	Drizzling Rain
8	·318	76·5	75·7	73·4	3 W N W	Lt. Rain Overcast	·778	77·5	76·5	74·1	4 N W	Drizzling Rain	·654	78·0	77·3	74·6	3 N W	Drizzling Rain
9	·633	76·5	75·5	72·3	1 W	Overcast Dull	·730	77·5	77·2	73·0	4 W	Overcast Dull	·703	78·0	78·2	73·7	2 N by W	Moderately Fair
10 S.	·698	76·5	75·3	71·9	1 N W	Overcast	·755	76·5	76·2	73·0	3 W by N	Overct. Misty Rain	·724	75·0	74·6	72·4	4 N W	Overcast Raining
11	·717	75·5	75·1	71·9	1 W	Cum.	·775	78·5	78·7	74·4	3 W	Fair and Cum.	·740	80·5	80·7	74·9	3 W N W	Fair and Cum.
12	·730	76·0	75·0	72·1	1 N W	Cum. Str. and Fair	·764	79·5	80·1	75·3	3 N W	Fair and Cum.	·728	81·0	81·7	75·3	2 W	Cum.
13	·688	76·5	74·9	72·5	1 N W	Cirri Fair	·719	80·0	80·1	73·9	4 N W	Fair and Cum.	·681	82·0	82·2	74·3	4 N by W	Fair and Cum.
14	·671	76·5	75·5	71·7	1 W	Cir. Str.	·720	79·0	78·9	72·8	2 W by N	Cirri Strat.	·688	81·5	81·5	73·6	4 W by N	Cirri Str.
15	·738	76·5	75·7	71·3	1 N W	Cir. Cum and Fair	·788	80·0	82·1	74·2	3 W	Cirri and Fair	·756	83·0	83·1	74·0	3 N W	Cum. and Fair
16	·756	77·6	76·5	72·4	1 N W	Fair and Cum.	·812	82·5	83·2	74·6	2 W by N	Fair and Cirri	·782	85·0	87·6	75·8	2 W N W	Fair and Cum.
17 S.	·781	78·0	76·7	73·9	1 S W	Overcast Light Rain	·825	81·0	81·8	77·8	0 E by S	Cum.	·776	84·0	85·2	79·8	1 S W	Cum. and Fair
18	·778	79·0	76·8	75·0	0 S	Cum.	·806	82·5	82·1	77·8	1 S W	Fair and Cum.	·746	84·0	86·4	78·7	1 N N W	Fair and Cum.
19	·729	79·5	79·2	76·8	0 N E	Diffused Cum.	·776	84·0	85·3	70·2	0 N E	Fair & Raggd. Cum.	·691	88·0	89·0	79·2	0 N N W	Fair and Cum.
20	·698	80·0	79·1	76·8	0 S W	Cum. Str.	·750	81·5	81·2	77·9	2 S W	Slight Rain	·708	79·0	78·7	75·6	0 W	Dull Overcast
21	·715	78·0	77·9	75·3	1 W by N	Dull Overcast	·754	80·5	81·8	77·2	1 N W	Fair and Cum.	·722	83·5	84·7	78·1	1 N W	Fair and Cum.
22	·720	79·0	76·8	75·0	0 S W	Cum.	·748	81·0	81·2	77·1	0 E N E	Diffused Cum.	·729	82·5	83·3	78·0	0 N N W	Fair & Diffd. Cum.
23	·703	80·0	79·2	76·8	0 W	Fair and Cir. Cum.	·758	82·5	83·8	79·6	0 W by N	Fair and Cum.	·711	84·5	85·9	79·3	0 W by N	Fair & Diffd. Cum.
24 S.	·678	79·2	79·0	76·6	0 N W	Fair and Cum. Str.	·743	83·0	84·7	80·4	0 E	Fair and Cum.	·688	86·5	88·4	79·9	0 N	Fair and Cum.
25	·667	78·5	78·4	76·3	0 W	Fair and Cir. Cum.	·728	84·0	84·7	80·1	1 S E	Fair and Cum.	·687	87·0	87·9	80·2	2 S E	Fair and Cum.
26	·648	79·0	78·8	76·4	1 N E	Fair and Cir. Cum.	·700	84·0	84·7	77·8	2 E by S	Fair and Cum.	·652	87·0	86·7	76·2	2 S E	Fair and Cum.
27	·612	79·0	77·5	75·5	0 N	Nearly Clear	·667	82·5	83·7	78·3	1 N N E	Fair and Cum.	·628	86·0	86·8	79·1	0 S E	Fair and Cum.
28	·667	79·5	78·6	75·9	0 N N W	Cum. Strat	·711	82·0	82·5	78·4	1 N W	Overcast Cum.	·648	86·0	87·2	80·4	0 N N W	F.&Cum. Th. in N E
29	·711	80·0	78·8	76·3	0 N W	Cir. Cum.	·744	84·5	85·9	79·7	1 N	Clear	·682	85·5	86·4	80·8	1 Variable	Cumuli Thunder
30	·618	78·5	77·7	75·5	0 N N W	Overcast Cum.	·686	82·0	82·8	77·7	1 N	Overcast Cum.	·651	84·5	85·6	79·9	1 N E	Cum. and Fair
31 S.	·612	80·0	79·7	77·2	0 W	Dull Overcast	·658	82·0	82·0	78·6	1 W	Dull Overcast	·620	84 0	84·2	79·3	1 W by S	Diffused Cum.
Means.	28·666	78·0	77·2	74·5	.....	.....	28·717	80·7	81·1	76·5	.....	.....	28·677	82·5	83·1	77·1	.....	.....

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Days of the Month.	Observations at 4h. 26m. P. M. Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 2h. 40m.	Aspect of Sky.	Minimum Pressure at 4 P. M. Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 2h 40m. to 4 P. M.	Aspect of Sky.	Observations at Sunset. Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 4 P. M. to Sunset.	Aspect of Sky.	Under NNE Verandah. Per Register Instr. Max.	Under NNE Verandah. Per Register Instr. Min.	Max. in Sun's Rays Per Spherical Black Bulb Reg. Instr.	Rain Gauge on Ground Registered at 6 A. M.	Phases of the Moon.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
1	28·482	85·5	86·7	79·0	1 N	Fair and Cum.	28·451	87·0	87·2	78·6	1 N	Fair and Cum.	28·478	84·5	85·2	77·4	1 N by W	Fair and Cum.	88·3	76·9	...	·412	
2	·551	86·0	86·5	78·5	1 N W	Fair and Cum.	·520	85·0	84·7	77·3	3 N W	Dull Cum.	·562	83·0	81·9	77·2	2 N W	Fair and Cum.	87·3	77·2	...	·037	
3 S.	·601	86·5	83·9	76·7	3 N W	Cum.	·578	84·0	84·5	76·3	3 N W	Fair and Cum.	·595	82·0	79·2	75·4	2 N N W	Fair and Cum.	87·2	77·3	...	...	
4	·566	78·5	78·9	76·3	1 W	Raining	·547	78·0	78·7	76·5	1 W	Raing. Thund.	·558	78·0	77·9	76·0	1 N W	Overcast Dull	80·1	76·7	...	...	☽ First
5	·533	79·5	80·3	76·7	5 N W	F. & Diff. Cum.	·494	80·0	80·3	77·1	2 N W	F. & Diff. Cum.	·528	78·5	79·7	76·5	1 N W	Fair and Cum.	81·4	75·3	...	1·412	
6	·525	83·0	83·5	78·4	4 W	Fair and Cum.	·522	82·5	82·1	77·7	4 N W	Cum.	·547	79·5	79·1	76·5	4 N W	Cum.	84·6	76·1	...	·274	
7	·576	81·0	81·3	76·4	3 Variable	Diffused Cum.	·549	81·5	81·2	76·1	2 N W	F. & Diff. Cum.	·584	80·5	80·5	76·3	2 W N W	Raining	82·6	75·4	119·0	·143	
8	·592	78·0	77·3	74·9	3 N W	Drizzling Rain	·580	78·5	78·2	74·8	4 W	Mode. Clear	·599	77·0	77·5	73·9	2 W by N	Mode. Clear	79·7	75·0	113·5	·930	
9	·672	77·5	77·5	73·5	2 N W	Dull Overcast	·641	76·5	76·5	73·5	1 W N W	Dull Cum.	·662	77·5	77·1	73·3	1 S W	Mode. Fair	79·6	75·1	...	·051	
10 S.	·695	78·0	78·3	73·9	4 N W	Moderately Fr.	·660	78·5	78·8	73·8	3 N W	Mode. Fair	·700	77·5	77·2	74·1	2 W by N	Cum. and Fair	80·1	74·8	...	·002	
11	·692	82·0	82·2	75·1	2 N W	Moderate Fair	·677	81·0	81·0	76·3	4 W	Cum. and Fair	...	On	Duty	...	.....	.....	83·6	73·4	122·5	·066	○ Full
12	·683	83·5	83·7	76·1	3 N by W	Fair and Cum.	·664	83·5	83·3	75·4	3 N by W	Fair and Cum.	·677	81·0	81·3	75·2	2 W N W	Fr. & Cum. Str.	84·7	73·3	...	...	
13	·614	83·0	83·3	75·0	3 N W	Fair and Cum.	·597	83·0	83·1	75·6	3 W N W	Fair and Cum.	·636	81·0	80·3	73·6	4 W	Fair and Cum.	84·9	74·0	...	...	
14	·646	81·0	84·2	74·3	4 W by S	Fair and Cum.	·634	84·0	83·6	73·9	5 N W	Fair and Cum.	·669	81·5	81·6	74·8	1 S W	Fair and Cum.	85·3	74·8	100·0	...	
15	·707	84·0	83·1	74·3	3 N W	Cum. and Str.	·688	84·0	83·7	73·8	3 N W	Fair and Cum.	·716	82·0	81·0	73·4	1 N W	Fair and Cum.	85·9	75·4	103·0	...	
16	·732	84·5	85·6	76·2	3 N	Raining	·701	84·5	84·5	74·4	2 N N W	Fair and Cum.	·749	84·0	83·4	75·5	1 S W	Fr. & Cum. Str.	88·6	76·2	112·5	...	
17 S.	·730	80·5	81·5	76·2	1 N N W	Cum. and Fair	·702	82·0	81·7	76·4	1 N W	Cum.	·750	81·0	80·1	76·3	1 N W	Cum.	86·2	75·1	...	1·241	
18	·688	86·0	87·5	78·5	2 N E	T. in SEF&Cu.	·662	84·5	85·4	78·3	0 N E	Cum.	·679	83·0	83·4	78·7	0 N E	Diffused Cum.	89·8	74·7	111·5	·203	
19	·641	85·0	85·2	79·1	2 S E	Ov. Th. in S. E	·640	83·5	82·4	76·5	3 S by W	Overcast Dull	·668	81·0	81·2	75·8	0 S by W	Overcast	90·7	78·6	...	...	
20	·638	80·0	78·2	75·8	1 W	Raining	·625	79·5	79·1	76·3	0 N E	Dull Overcast	·641	79·0	79·7	77·2	0 S by E	Overcast	81·4	78·1	...	...	
21	·611	86·0	86·2	77·7	1 W N W	Fair and Cum.	·600	85·5	85·4	78·2	1 S	Cum.	·638	83·5	82·7	77·2	1 S W	Raining	87·0	87·2	115·0	·335	☾ Last
22	·630	83·5	84·4	78·9	1 N N W	Diffused Cum.	·607	84·0	84·3	79·1	0 N N W	Diffused Cum.	·659	83·0	82·7	78·7	0 N N W	Diffused Cum.	85·8	76·5	...	1·373	
23	·648	87·0	88·6	78·8	0 W	Fair and Cum.	·614	87·5	88·4	78·5	1 N N E	Fair and Cum.	·647	84·5	85·8	79·7	1 N W	Fair and Cum.	88·9	75·8	...	...	
24 S.	·628	82·0	81·8	78·6	1 S by E	Cum.	·585	84·0	84·6	78·5	1 E by S	F. & Cum. Thr.	·646	83·0	83·4	79·2	0 E	Fair and Cum.	89·1	78·4	118·5	...	
25	·601	88·0	88·5	79·6	2 S E	F. & Diff. Cum.	·593	87·0	87·0	77·3	3 S E	Fr. & Cir. Strat	·662	85·0	85·1	78·3	0 E by S	Fair and Cum.	89·8	78·5	...	·094	
26	·587	88·0	88·8	76·8	3 E N E	Fair and Cum.	·524	88·5	89·1	77·7	3 E by N	Fair and Cum.	·566	85·0	85·3	77·2	2 S E	Fair and Cum.	90·0	78·7	...	...	● New
27	·545	87·0	87·4	79·3	0 S E	Fair and Cum.	·527	86·5	86·8	80·1	0 S E	Cumuli	·574	85·0	85·1	78·9	0 S E	Cum.	88·5	77·8	116·5	·051	
28	·593	82·0	82·3	78·0	1 S E	Fair and Cum.	·568	85·0	85·3	80·2	2 S S E	Diffused Cum.	·595	83·0	82·5	78·7	0 W	Overcast Cum.	87·6	78·6	118·0	·047	
29	·620	84·5	84·4	79·6	0 N E	Lt. Rn. Th. & Lt.	·596	81·5	80·3	75·9	1 S W	Raing. Heavily	·648	81·0	80·1	75·7	1 N	Lt. Rn. Overct.	90·2	77·9	111·0	·356	
30	·562	85·5	86·3	79·4	1 N N E	Cum. Overct.	·539	84·5	85·1	79·6	0 N N E	Overct. Thunr.	·574	83·0	82·6	78·3	0 S E	Overcast	89·2	77·4	...	·360	
31 S.	·552	82·0	82·1	79·4	1 N W	Raining	·546	84·0	84·8	79·7	1 N W	Fair and Cum.	·602	79·0	78·3	76·1	1 N W	Raing. Overct.	88·0	78·0	...	·002	
Means.	28·617	83·1	83·5	77·1	.....	.....	28·594	83·1	83·2	76·9	.....	.....	28·626	81·5	81·3	76·5	.....	.....	86·0	76·3	113·4	7·389	.....

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Days of the Month.	Barometer uncorrected for temperature.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunset to Sunrise.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunrise to 9h. 50m.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 9h. 50m. to apparent noon.	Aspect of Sky.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
1	28·656	78·0	77·6	75·4	1 W	Raining Overct.	28·695	79·0	78·8	75·9	2 N W	Overct. Diffd. Cum.	28·668	80·0	80·3	76·6	2 N W	Overct. Diffd. Cum.
2	·664	78·0	77·6	75·3	1 W	Overct. Cum.	·711	79·0	78·6	75·3	2 N W	Overct.	·655	79·5	79·4	76·5	1 W	Overct.
3	·667	77·0	77·6	74·6	1 W	Dull Overct.	·720	79·0	79·0	76·1	1 W N W	Overct. Cum.	·672	81·0	80·9	77·8	1 W N W	Cum.
4	·640	76·5	76·4	74·2	1 S W	Dull Overct.	·682	79·0	79·8	76·1	3 N W	Cum.	·619	80·5	81·7	78·1	3 N W	Cum.
5	·625	76·5	76·2	74·3	1 W	Raining Overct.	·695	77·0	77·1	74·3	2 N W	Overct. Dull	·647	79·5	80·0	76·4	2 N W	Cum.
6	·696	75·0	74·7	72·7	2 N W	Overct. Drizzling.	·756	76·0	75·8	74·0	2 W	Drizzling Overct.	·742	76·5	76·3	74·5	2 W by N	Drizzling Dull
7 S.	·701	74·0	74·1	72·3	2 W	Raining	·720	75·0	74·9	72·6	4 W	Drizzling Overct.	·693	75·5	75·5	73·2	4 W	Drizzling Overct.
8	·636	75·0	74·9	72·6	2 N W	Overct. Dull	·678	76·0	75·7	73·1	3 N W	Drizzling Overct.	·660	76·5	76·5	73·3	3 N W	Overct.
9	·658	75·0	75·1	72·8	1 N W	Overct.	·714	76·5	76·9	73·8	2 N W	Overct.	·672	78·0	78·6	74·3	3 N W	Diffd. Cum.
10	·634	75·5	76·0	74·1	1 W by N	Dull Overct.	·672	78·5	78·8	76·2	2 N W	Dull Cum.	·600	80·0	80·0	77·5	1 W N W	Raining
11	·699	77·5	76·9	75·9	1 N W	Raining Dull	·637	80·0	80·6	78·9	1 W	Cum. Str.	·606	83·0	83·2	79·5	2 N W	Cum. Str.
12	·628	76·0	75·8	74·1	1 W	Dull Overct.	·685	78·0	78·3	78·5	1 W	Diffused Cum.	·651	80·0	81·3	77·7	2 N N W	Fair and Cum. Str.
13	·679	76·0	75·7	74·2	1 N W	Lt. Rain Overct.	·714	77·5	77·8	75·8	3 W	Lt. Diffd. Cum.	·676	79·0	78·8	76·4	4 W S W	Diffd. Cum.
14 S.	·721	74·5	74·1	71·3	2 W	Dull Overct.	·800	74·5	74·3	71·7	3 W N W	Lt. Rain Overct.	·784	75·5	75·4	72·3	3 W by N	Lt. Rain Overct.
15	·784	75·0	74·6	72·4	1 N W	Dull Cum.	·850	78·0	77·8	73·9	2 N W	Cum. and Fair	·807	80·0	80·4	73·7	4 N W	Fair and Cum.
16	·811	73·5	73·4	70·5	1 W	Cir. Str.	·881	78·0	78·5	73·2	4 W	Cum. and Fair	·832	81·0	81·2	74·0	2 N N W	Fair and Lt. Cum.
17	·814	74·5	74·2	71·3	1 W	Cum. Str.	·879	78·0	77·9	71·9	2 W	Cir. Cum.	·840	80·0	80·3	71·7	3 N W	Cir. Cum.
18	·827	73·0	72·5	69·0	1 W	Cirri	·890	77·5	77·8	70·1	3 N W	Fair and Cum.	·851	80·0	80·6	72·1	2 N N W	Fair and Cum.
19	·848	71·5	71·1	66·3	1 W	Clear	·923	76·0	76·0	68·0	2 N W	Clear	·868	79·0	79·4	69·9	2 W N W	Fair and Cum.
20	·840	72·0	71·3	66·5	1 W by S	Clear	·888	77·0	77·4	68·5	3 N W	Clear	·832	80·5	80·8	70·4	2 W N W	Clear
21 S.	·847	73·0	69·6	66·8	1 W	Clear	·887	77·5	78·1	70·0	1 W	Clear	·844	81·5	82·8	72·6	2 W	Clear
22	·870	74·5	71·0	68·3	1 W	Lt. Cirri	·927	79·0	79·0	72·1	1 N N W	Clear	·885	83·0	81·2	72·9	2 N N W	Fair and Lt. Cum.
23	·846	75·5	74·1	70·5	1 W N W	Cirri	·912	81·5	82·2	73·7	1 N N W	Clear	·862	85·0	86·1	72·5	1 N N W	Clear
24	·831	76·0	73·1	68·9	0 N	Clear	·876	82·0	83·2	73·8	1 N by W	Clear	·850	86·0	86·7	72·0	2 N	Fair and Lt. Cum.
25	·844	75·0	73·7	69·2	0 N	Clear	·901	81·0	82·6	71·7	1 N	Cum. and Fair	·862	84·5	86·9	71·8	1 N	Clear
26	·850	72·5	72·2	66·7	1 N E	Clear	·945	81·0	82·2	70·5	1 N E	Clear	·908	86·0	85·7	69·7	2 N by W	Clear
27	·825	73·0	72·4	66·5	1 N E	Clear	·892	81·5	86·3	70·1	1 N	Clear	·846	87·0	88·5	68·9	1 N N W	Clear
28 S.	·800	72·0	69·8	64·5	1 N E	Clear	·851	80·5	81·3	70·0	1 N W	Clear	·800	85·5	88·5	68·9	1 N E	Clear
29	·778	72·0	66·9	62·7	1 N E	Clear	·842	80·5	81·3	68·6	1 N E	Clear	·797	86·5	87·1	69·9	1 N	Clear
30	·799	73·0	67·8	63·9	1 E by N	Clear	·856	81·5	81·8	69·0	1 N E	Clear	·810	87·5	87·5	70·2	2 N N W	Clear
Means	28·747	74·6	73·6	70·5	.....	.....	28·802	78·5	79·0	72·9	.....	.....	28·761	81·3	81·8	73·5	.....	.....

	Observations at 2h. 40m. P. M.						Minimum Pressure at 4 P. M.						Observations at Sunset.						Under N N E Verandah. Per Register Instr.				
	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb	Temperature. External. W. Bulb.	Wind. Direction and force from apparent noon to 2h. 40m.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 2h. 40m. to 4 P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 4 P M to Sunset.	Aspect of Sky.	Max.	Min.	Max. in Sun's Rays Per Spherical Black Bulb Reg. Instr.	Rain Gauge on Ground, registered at 6 A. M.	Phases of the Moon
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
	28·607	82·0	82·1	77·7	2 N W	Diffused Cum.	28·589	82·5	82 1	77·7	2 W	Diffused Cum.	28·623	81·0	80·9	76·8	2 N W	Diffused Cum.	83·6	76·8	...	·501	
	·614	80·0	79·6	76·4	1 W	Overcast	·592	80·0	79·7	76·5	2 W	Overcast	·618	79·5	78·4	75·4	1 W	Overcast	80·3	75·8	...	·019	☽ First
	·612	81·5	81·4	77·3	3 W	Cum.	·600	79·5	79·4	76·8	2 W	Raining	·631	79·0	78·5	75·7	1 S W	Overcast	80·3	76·2	...	·009	
	·571	82·0	82·1	77·3	3 N W	Cum.	·554	80·5	80·3	77·1	2 N W	Dull Cum.	·576	78·5	78·6	75·8	2 W by S	Dull Cum.	82·4	76·3	...	·111	
	·612	81·5	81·5	76·7	2 N W	Cum.	·596	81·5	81·6	77·5	2 N W	Cum.	·652	79·5	79·4	76·2	2 N W	Cum.	83·0	75·1	...	·221	
	·682	77·5	77·8	76·3	1 W	Raing. Overct.	·666	77·5	77·7	76·3	1 W	Raining	·697	77·0	77·0	74·0	1 W	Raining	82·7	73·8	...	·042	
S.	·628	77·5	77·7	76·2	4 W by N	Diffused Cum.	·600	78·5	78·8	75·8	4 W	Fr. & Diff. Cum.	·633	77·5	77·4	75·4	2 W	Lt. Rain Overt.	78·8	73·2	...	1·131	
	·593	78·0	78·3	74·6	3 N W	F. & Diff. Cum.	·571	78·0	77·9	74·5	3 N W	Diffused Cum.	...	...	On	Duty	.....	.....	80·0	73·1	...	·108	
	·618	80·0	79·8	74·5	4 N W	Diffd. Cum.	·584	79·0	79·2	74·7	2 N W	Dull Cum.	·616	78·5	77·9	75·4	2 W N W	Dull Cum.	80·9	74·5	...	·011	
	·584	78·0	78·2	76·6	1 E	Cum.	·548	81·0	81·6	78·8	1 W by S	Cum. and Fair	·583	77·5	77·3	75·8	2 W by N	Dull Th. in E.	82·1	75·2	...	·173	○ Full.
	·548	81·0	81.1	78·7	0 N by W	Cum. Str.	·515	79·5	79·4	78·2	1 N	Raing. Dk. Ovt.	·541	78·5	78·5	76·6	1 N W	Raining	85·0	76·0	...	1·051	
	·596	80·0	80·2	76·9	1 N N W	Overcast	·580	80·0	79·9	77·6	1 W	Raining	·619	79·5	79·4	78 1	W	Lt. Rain	82·1	74·9	...	3·146	
	·650	77·5	76·8	75·1	3 N W	Lt. Rain Overct	·627	77·5	76·9	75·7	2 W	Raining	·661	77·0	76·6	74·8	1 W	Lt. Rain	81·6	75·3	...	3·554	
S.	·734	76·0	76·2	73·2	3 N W	Overcast	·723	76·5	76·1	73·3	3 W by N	Overcast	·767	75·0	75·7	74·5	1 N W	Overcast	77·0	73·2	...	·841	
	·788	81·5	81·5	74·4	2 N W	Fair and Cum.	·759	81·0	81·3	73·1	2 N W	Fair and Cum	·798	80·0	78·8	72·3	1 N W	Fair & Ovevct.	82·4	73·7	99·5	·046	
	·788	82·5	82·6	74·4	3 W	Fair and Cum.	·771	83·0	82·6	73·5	3 W	Fair and Cum.	·786	80·5	79·9	72·7	1 W by N	Fair & Cir. Str.	84·1	71·9	101·5	...	
	·810	82·5	82·6	72·5	3 N W	Cir. Cum. & Fr.	·782	83·0	82·5	71·8	3 N W	Cir. Cum. Fair	·817	79·5	79·0	71·8	2 N W	Fair and Cum.	83·6	73·9	...	...	
	·799	82·5	82·3	70·4	3 N W	Fair and Cum.	·777	82·5	82·6	71·2	3 N W	Fair and Cum.	·818	78·5	78·4	70·7	1 N W	Cirri Str.	83·4	72·8	100·0	...	☾ Last.
	·817	82·0	81·8	70·3	2 N W	Fair and Cum.	·800	82·0	81·2	70·6	2 N W	Fair and Cum.	·827	79·0	78·7	69·9	1 N W	Clear	82·3	69·8	102·5	...	
	·803	79·5	81·4	69·7	3 N W	Fair and Cum.	·792	81·0	80·8	70·1	1 N W	Fr. & Cum. Str.	·822	80·0	79·2	69·4	1 N W	Fair and Cum.	83·2	70·4	102·5	...	
S.	·794	83·5	84·1	70·9	2 W	Clear	·778	84·0	83·6	71·4	1 N W	Fair	·823	80·5	80·5	71·0	1 N W	Clear	84·7	69·7	105·0	...	
	·838	85·0	85·6	73·4	1 N	Fr. & Lt. Cirri	·810	85·0	84·7	72·8	1 N by W	Fr. & Cir. Cum.	·848	82·0	81·8	73·2	1 N by W	Cirri	87·3	72·1	108·5	...	
	·803	87·0	87·2	71·2	2 N N W	Clear	·787	87·0	87·2	70·6	1 N	Clear	·814	84·5	83·4	71·3	1 N by W	Fair & Cir. Str.	88 0	72·9	111·5	...	
	·808	87·5	88·4	71·0	3 N	Clear	·778	88·0	88·3	70·3	1 N	Clear	·817	84·5	84·4	70·5	1 N by E	Clear	89·1	71·8	112·5	...	
	·819	88·0	88·5	71·2	1 N	Clear	·796	88·5	88·2	70·4	1 N	Clear	·848	84·5	84·1	70·2	1 N by E	Clear	90·0	71·2	118·0	...	● New.
	·868	88·3	89·4	69·4	2 N	Clear	·832	88·0	89·1	69·3	1 N	Clear	·859	85·0	85·2	69·4	1 N E	Clear	90·1	70·9	116·0	...	
	·782	88·5	89·8	68·9	2 N by E	Clear	·763	87·5	89·1	66·5	2 E by N	Clear	·785	84·0	85·0	67·8	1 N E	Clear	90·7	71·2	115 0	...	
J.	·765	88·5	89·6	67·3	3 N by E	Clear	·737	88·0	88·2	68·3	1 N by E	Clear	·762	84·5	84·2	67·5	1 N by E	Clear	90·5	69·8	115·5	...	
	·752	88·0	89·9	67·8	1 N	Fr. & Lt. Cum.	·734	89·0	89·1	67·8	2 N by E	Clear	·774	84·5	84·4	68·0	1 N	Clear	90·9	67·0	114·5	...	
	·771	89·5	89·5	69·7	2 N W	Clear	·733	90·0	90·4	67·1	3 N	Clear	·786	85·0	84·8	69·4	1 N	Clear	91·4	68 0	109·5	...	

...re Meteorological Observations, October, 1851.—*Lat.* 22° 56′ 59.8″ *N.*—*Long.* 79° 18′ 00″ *E.*—*Var.* 1° 43′ 20″—*Dip.* 25° 17′.

Days of the month	Observations at Sunrise. Barometer uncorrected for temperature.	Temperature. Of the Mer.	External. D. Bulb.	External. W. Bulb.	Wind. Direction and force from Sunset to Sunrise.	Aspect of Sky.	Maximum Pressure at 9h. 50m. A. M. Barometer uncorrected.	Temperature. Of the Mer.	External. D. Bulb.	External. W. Bulb.	Wind. Direction and force from Sunrise to 9h. 50m.	Aspect of Sky.	Observations at Apparent Noon. Barometer uncorrected.	Temperature. Of the Mer.	External. D. Bulb.	External. W. Bulb.	Wind. Direction and force from 9h. 50m. to apparent noon.	Aspect of Sky.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
1	28·762	72·0	69·7	63·8	1 N E	Clear	28·793	82·5	82·7	69·6	2 N W	Clear	28·774	88·0	88·1	68·5	2 N by W	Clear
2	·739	71·5	66·6	60·8	1 N N E	Hazy Cirri	·815	82·0	82·6	68·3	2 N N E	Clear	·772	87·0	88·4	69·3	2 S E	Clear
3	·788	74·0	70·2	65·0	1 E	Fr. & Lt. Cir. Cum.	·849	83·0	84·8	71·1	2 N E	Fair and Lt. Cum.	·797	86·0	88·3	73·5	2 N E	Fair & Lt. Cum.
4	·788	79·0	78·6	74·7	1 N E	Cum. Str.	·836	84·0	85·0	76·9	1 N E	Fair and Lt. Cum.	·780	87·0	89·9	77·5	2 N E	Fair & Lt. Cum.
5 S.	·761	81·0	80·1	75·2	1 N W	Cum.	·820	84·5	85·3	77·1	1 N by W	Fair and Lt. Cum.	·772	87·5	89·8	78·5	1 E	Fair and Cum.
6	·720	78·5	77·3	71·7	0 W by N	Fair & Cum. Str.	·788	84·0	85·3	76·5	1 N by W	Fair and Cum.	·751	88·5	89·8	74·6	1 N E	Fair and Cum.
7	·772	78·5	75·1	70·4	1 N E	Clear	·841	83·0	83·5	73·9	2 N E	Clear	·796	88·0	88·2	74·5	2 N E	Cum. and Fair
8	·746	77·0	76·0	71·7	1 N	Cirri	·804	81·5	82·4	74·1	3 N	Fair and Cum.	·757	85·0	85·4	75·0	3 N	Fair and Cum.
9	·745	78·0	75·8	71·2	1 N by W	Cirri	·790	81·0	81·7	74·2	2 N	Cum.	·744	83·0	83·8	75·0	2 N	Fair and Cum.
10	·762	78·0	73·3	71·6	1 N	Fair and Cirri	·811	84·0	84·8	75·5	2 N	Cum.	·764	85·0	85·3	76·0	1 N	Cum.
11	·811	80·0	77·3	73·4	1 S E	Cirri	·860	84·0	84·8	76·5	2 N W	Clear	·783	87·5	89·2	76·7	2 N	Large Cum. & Fair
12 S.	·826	79·5	78·5	74·5	1 N E	Cum.	·871	81·5	81·2	76·1	2 N by W	Cir. Str.	·797	83·0	88·2	77·3	2 N W	Overct. Heavy Rain
13	·789	76·5	76·2	72·1	1 N W	Cirri Cum.	·856	80·5	80·7	74·3	2 W	Cirri	·800	85·0	84·7	74·8	2 S W	Th. & Lt. Cum. & F.
14	·784	73·0	67·3	64·3	1 N W	Clear	·856	80·0	79·3	71·0	1 N W	Clear	·782	33·0	85·6	63·5	1 N N E	Clear
15	·811	70·5	63·7	60·8	1 S	Clear	·898	79·5	79·7	63·4	2 N E	Clear	·841	83·5	86·2	66·9	3 N N E	Clear
16	·822	77·0	74·2	70·1	0 N	Diffused Cum.	·871	80·5	80·8	69·2	1 E N E	Diffused Cum.	·820	83·5	85·5	72·3	2 N N E	Diffused Cum.
17	·857	76·5	71·3	68·0	0 N E	Cirri	·944	80·0	79·8	70·4	2 S E	Lt. Cum.	·884	82·0	82·1	71·4	2 S E	Lt. Cum.
18	·902	75·5	72·7	68·6	1 N E	Fair and Cum.	·965	81·0	82·2	72·4	2 N E	Fair and Cum.	·888	84·5	85·2	73·3	1 S E	Cum.
19 S.	·873	77·0	75·6	72·4	0 N E	Cum. and Fair	·922	81·0	81·1	74·3	1 N E	Cum. and Fair	·868	85·0	87·2	71·2	3 N E	Fair & Cum.
20	·893	74·5	70·2	65·4	1 N E	Clear	·937	81·5	82·1	72·9	1 E N E	Clear	·887	84·5	85·5	69·8	2 N	Fair & Lt. Cum.
21	·851	73·0	67·2	62·1	1 E	Clear	·900	79·5	79·8	70·0	1 N E	Clear	·841	83·0	84·7	70·1	2 N by E	Clear
22	·832	70·0	67·9	61·8	1 N E	Clear	·882	78·0	78·2	68·3	1 N by W	Clear	·847	82·5	82·8	68·6	2 N N E	Clear
23	·868	67·5	64·4	57·3	1 N N W	Clear	·924	78·0	81·1	63·3	1 W by N	Clear	·878	84·0	84·9	64·5	1 N	Clear
24	·813	66·0	63·9	56·1	1 N	Clear	·895	78·0	78·2	62·2	2 W by N	Clear	·848	85·0	88·3	63·7	3 N W	Clear
25	·860	68·0	66·8	57·7	1 W by S	Clear	·930	79·5	79·0	64·3	2 W	Clear	·894	84·0	83·9	64·1	3 N by W	Clear
26 S.	·910	68·0	63·8	57·1	1 N	Clear	·997	78·0	77·4	63·3	2 N W	Clear	·955	84·5	82·6	64·7	3 N W	Clear
27	...	...	...	...	.....	.....	...	...	..	...	.....	.....	...	...	...	...	.....	.....
28	...	...	...	...	.....	.....	...	...	...	...	.....	.....	...	...	...	...	.....	.....
29	...	...	...	...	.....	.....	29·054	77·5	76·8	64·8	1 N E	Clear	29·006	83·0	83·4	64·5	1 N	Clear
30	·952	66·0	64·2	55·8	1 N	Clear	·046	77·5	76·8	63·8	1 N	Clear	·003	85·0	84·0	66·0	2 N by W	Clear
31	·967	66·0	65·1	57·6	1 N E	Clear	·061	77·0	77·6	65·4	1 N E	Clear	·015	83·0	83·2	65·8	1 N E	Clear
Means.	28·821	74·0	71·1	66·1	.....	.....	28·890	80·7	81·2	70·4	.....	.....	28·839	84·8	85·5	70·8	.....	.....

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	Observations at 2h. 40m. P. M.						Minimum Pressure at 4 P. M.						Observations at Su set.						Under N N E Verandah. Per Register Instr.				
	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from apparent Noon to 2·40 P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 2·40 to 4 P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 4 P. M. to Sunset.	Aspect of Sky.	Max.	Min.	Max. in Sun's Rays Per Spherical Black Bulb Reg. Instr.	Rain Gauge on Ground, registered at 6 A. M.	Phases of the Moon.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
	28·725	91·0	91·5	65·8	4 N	Clear	28·712	90·5	90·7	66·1	3 N	Clear	28·750	85·5	85·7	67·7	1 N	Clear	92·2	68·5	112·0	..	
	·722	89·0	90·4	69·5	2 N	Cirri	·701	88·5	89·0	68·4	2 N	Cirri	...	...	Ab-	sent.	.....	.....	91·3	66·6	117·5	...	☽ First
	·724	88·0	89·7	74·5	2 N	F. & Lt. Cum.	·709	89·0	89·5	73·7	3 N	Fair and Cum.	·757	86·0	86·8	74·0	1 N	Cum.	91·5	78·1	115·5	...	
	·702	87·0	88·7	77·5	1 S E	Fair & Cumuli	·693	87·5	88·4	75·7	3 N	Fair and Cum.	·738	85·0	85·1	76·2	1 N	Cum.	90·8	77·9	121·0	...	
3.	·689	89·5	90·8	75·7	3 N E	F. & Dk. Cum.	·658	89·0	89·6	74·8	2 N E	Fair and Cum.	·700	85·5	85·0	75·6	1 N E	Fair and Cum.	92·2	78·3	122·5	...	
	·702	89·0	90·7	75·0	2 N E	Fair and Cum	·677	90·0	91·2	72·3	2 N E	Fair and Cum.	·717	86·0	87·4	71·8	1 N E	Fair and Cum.	92·4	76·3	117·5	...	
	·735	88·5	88·9	75·7	2 N E	Cum. and Fair	·703	89·0	88·8	74·7	3 N E	Fair and Cum.	...	...	Ab-	sent.	.....	.....	90·4	74·3	111·5	...	
	·698	87·5	87·2	74·6	3 N	Fair and Cum.	·674	86·5	86·2	74·3	3 N	Fair and Cum.	·718	84·5	83·0	73·6	3 N	Cirri	88·4	75·8	106·5	...	
	·691	84·5	85·9	75·2	3 N N W	Fair and Cum.	·670	84·0	85·6	74·3	3 N	Fair and Cum.	·723	83·0	82·4	73·8	2 N	Fair and Cum.	87·1	74·5	106·5	...	
	·720	88·0	87·8	76·2	2 N N W	Cum. and Fair	·695	89·0	88·8	75·0	1 N	Fair and Cum.	Ab-	sent	on	duty.	.....	.....	89·2	73·0	114·5	...	○ Full.
	·727	90·0	90·3	77·0	3 N W	F. & Cum. Th.	·709	87·5	87·5	75·7	2 E	F. & Cum. Th.	·747	83·5	83·1	74·9	1 S E	Thun. & Cum.	91·5	76·1	118·0	...	
3.	·738	81·0	80·6	76·7	1 S W	Overt. Th. in N.	·722	81·5	78·2	75·1	0 N W	Heavy Cum.	·758	80·5	79·3	75·8	1 N	Heavy Cum.	84·7	75·8	...	·038	
	·757	86·5	88·3	69·5	3 N	Cum. and Fair	·731	87·5	87·8	69·0	3 N	Cum. and Fair	·765	83·0	82·6	70·7	2 N	Fair and Cum.	89·0	74·5	109·5	·376	
	·752	86·5	87·0	67·0	1 N	Clear	·740	86·5	87·7	64·7	3 N N E	Clear	·783	82·5	82·6	66·2	1 N E	Clear	88·8	65·3	115·5	...	
	·771	86·0	88·3	66·7	4 N E	Cir. Cum.	·760	86·0	87·2	66·7	3 N E	Cirri Cum.	·798	82·5	81·8	64·7	1 N	Cirri Cum.	89·2	62·4	110·0	...	
	·793	85·0	86·6	72·5	2 N N E	Diffused Cum.	·774	84·5	86·1	72·2	2 N N E	Diffused Cum.	·815	82·0	83·6	70·3	1 N	Diff. Cum. Str.	87·2	73·0	...	...	
	·848	83·0	83·6	71·6	1 S E	Cum.	·835	82·5	82·4	71·5	1 E N E	Dull Cumull	·874	80·5	80·8	71·2	2 N E	Dull Cum.	84·3	71·1	108·5	...	
	·819	85·5	86·8	73·8	1 N by E	Cum. and Fair	·807	87·0	86·3	73·7	1 N	Cum. and Fair	·846	83·0	83·6	74·0	1 N by E	Cum.	88·2	70·8	114·0	...	☾ Last.
3.	·825	88·0	89·0	70·9	3 N by E	Fair and Cum.	·801	87·5	88·3	70·7	2 N by E	Clear	·842	83·0	83·7	70·3	1 N by E	Clear	89·4	74·7	114·0	·004	
	·830	86·5	86·5	66·3	1 N by E	Clear	·814	86·5	86·5	66·4	2 N	Clear	·859	81·5	82·2	66·7	1 N	Lt. Cir. & Fair	88·0	69·9	112·5	...	
	·800	85·5	87·1	66·0	3 N	Clear	·784	86·0	86·1	66·8	3 N	Clear	·824	82·5	81·8	66·1	1 N by E	Clear	87·6	66·7	110·0	...	
	·775	87·0	87·4	63·8	3 N	Clear	·752	85·0	86·7	64·3	2 N	Clear	·803	82·0	81·5	66·2	1 N N E	Clear	88·7	65·4	113·5	...	
	·814	88·5	89·1	62·0	3 N	Clear	·797	88·0	88·3	62·2	2 N	Clear	·838	81·0	81·4	63·9	1 N W	Clear	89·6	61·2	108·5	...	
	·782	87·0	83·1	64·2	3 N W	Clear	·756	87·0	85·6	64·2	2 N N W	Clear	·807	81·0	82·0	63·6	1 W	Clear	87·9	59·8	108·5	...	● New.
	·822	85·5	85·5	63·8	2 N by W	Clear	·805	85·5	84·4	64·4	1 N W	Clear	...	...	Ab-	sent.	.....	.....	86·0	62·8	104·5	...	
3.	·916	84·0	84·8	64·0	2 N N E	Clear	·886	84·0	84·5	64·7	1 N	Clear	·935	80·5	79·6	64·7	0 N	Clear	85·6	62·6	112·5	...	
	...	...	...	...	.....	.....	...	...	...	...	.....	.....	...	...	...	...	.....	.....	...	...	...	...	
	...	...	...	...	.....	.....	...	...	...	...	.....	.....	...	...	...	...	.....	.....	...	...	...	...	
	·950	85·0	86·0	64·4	1 N	Clear	·921	86·0	84·6	63·2	1 N	Clear	·962	80·0	80·1	63·7	1 N	Clear	85·7	...	...	...	
	·944	85·5	84·8	65·9	1 N N W	Clear [Cum.	·920	85·5	83·9	67·1	1 N	Clear	·973	80·5	80·3	66·4	0 N	Clear	87·4	61·8	108·0	...	
	·963	86·0	85·8	63·1	1 N	Lt. Detached	·951	86·0	86·8	64·7	2 N	Lt. Detd. Cum.	·999	81·0	82·4	64·9	1 N	Clear	87·8	60·9	113·0	...	
ns.	28·783	83·6	87·3	70·1	.....	.....	28·764	86·6	86·7	69·5	.....	.....	28·821	82·6	82·7	69·4	.....	.....	88·6	69·9	112·5	·418	.....

n.—1. Gentle Breeze.—2. Moderate Wind.—3. Brisk Breeze.—4. Strong Wind.—5. Stormy Breeze.—6. Moderate Gale.—7. Gale.—8. Violent Gale.—9. Hurricane.

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ore Meteorological Observations, November, 1851.—*Lat.* 22° 56′ 59″·8 *N.*—*Long.* 79° 18′ 34″ *E.*—*Var.* 1° 43′ 28″ —*Dip.* 25° 17′.

Days of the Month.	Observations at Sunrise. Barometer uncorrected for temperature.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunset to Sunrise.	Aspect of Sky.	Maximum Pressure at 9h. 50m. A. M. Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunrise to 9h. 50m.	Aspect of Sky.	Observations at Apparent Noon. Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 9h. 50m. to apparent noon.	Aspect of Sky.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
1	29·051	70·0	68·2	60·5	1 N	Clear	29·089	78·5	77·6	67·3	1 N E	Clear	29·036	83·5	82·7	66·5	2 N N E	Clear
2 S.	·010	68·0	65·2	59·1	0 N E	Clear	·067	77·0	77·0	66·3	1 E by S	Clear	·007	81·0	82·2	66·8	1 N E	Clear
3	28·973	68·0	65·5	58·6	1 N E	Clear	·036	76·5	76·5	65·4	1 N E	Clear	28·996	80·0	81·1	64·9	2 N E	Lt. Cirri
4	·912	67·0	62·7	57·4	0 E	Cirri	28·946	75·5	76·1	64·5	1 N E	Lt. Cirri	·898	79·5	81·3	65·2	1 N E	Lt. Cirri
5	·951	67·0	61·5	55·3	0 N N E	Cum.	·995	75·0	76·5	63·9	1 E S E	Clear	·926	80·0	80·9	63·6	2 N by E	Clear
6	·914	62·5	61·2	53·3	1 N E	Clear	·977	74·0	74·3	58·9	2 N N E	Clear	·930	77·5	79·3	60·5	2 N by E	Clear
7	·870	61·5	58·4	51·5	1 E	Cir. Cum.	·946	71·5	70·7	58·0	1 N E	Cir. Cum. Haze	·911	76·0	77·6	59·3	2 N E	Cir. Cum. Haze
8	·871	62·0	57·8	52·1	0 N	Cum. Overct.	·926	72·5	72·7	59·5	2 N E	Lt. Cum.	·884	78·0	78·7	60·4	1 E N E	Lt. Cum.
9 S.	·888	68·5	68·0	58·3	1 N E	Cir. Str.	·945	75·5	75·4	61·5	2 N E	Cir. and Fair	·889	80·5	79·6	64·8	2 N by E	Fair and Lt. Cum.
10	·844	70·0	67·1	61·5	1 E by N	Cum. and Fair	·948	77·0	76·7	68·8	2 E S E	Cum. and Fair	·904	79·0	80·4	71·5	2 E S E	Cum. and Fair
11	·953	73·0	70·6	69·4	0 N E	Dense fog	·999	77·0	76·7	73·0	2 S E	Cum. and Fair	·938	81·0	81·5	73·5	2 S S E	Cum.
12	·934	73·5	71·0	68·7	Variable	Cum. Str.	29·004	77·5	76·9	72·6	2 N E	Lt. Cum. and Fair	·920	79·5	79·8	73·2	2 N by E	Lt. Cum. and Fair
13	·950	68·5	64·1	60·9	1 N N E	Clear	·021	75·0	74·5	61·2	3 N N E	Clear	·966	77·5	78·4	61·6	3 N E	Clear
14	·987	62·0	58·1	53·9	1 N E	Clear	·038	73·0	72·0	58·1	1 N E	Clear	·951	76·0	76·9	59·6	1 N E	Clear
15	·919	59·0	58·6	52·7	1 E	Clear	·009	72·0	70·5	59·6	1 E	Clear	·964	75·5	76·7	59·7	1 E	Clear
16 S.	·910	63·0	60·2	55·0	1 N by E	Cirri	28·973	73·5	74·1	58·7	2 N E	Cirri	·929	76·5	78·6	60·6	2 N N E	Cirri
17	·894	61·0	60·6	53·8	1 E N E	Clear	·960	71·0	77·2	58·1	2 N E	Clear	·920	76·5	77·8	59·0	2 N E	Clear
18	·889	58·5	55·6	49·1	1 S E	Clear	·958	70·0	69·1	55·1	2 E by N	Clear	·931	73·0	73·6	55·4	2 E N E	Clear
19	·948	60·0	54·7	49·0	1 N N E	Clear	29·012	69·0	68·4	55·5	2 N E	Clear	·968	75·0	77·6	61·2	3 N by E	Clear
20	·933	62·5	61·4	53·7	1 E by S	Clear	·003	70·5	70·0	58·4	1 E	Clear	·939	76·5	78·8	63·0	1 N E	Clear
21	·892	68·0	64·3	57·8	0 N E	Detached Cum.	28·968	75·0	75·7	61·8	1 E S E	Clear	·926	79·0	80·0	65·9	1 N E	Clear
22	·846	68·5	66·1	59·7	1 N E	Lt. Cir. Cum.	·900	77·5	78·2	70·7	1 N W	Clear	·845	84·0	83·6	73·2	3 W N W	Cum and Fair
23 S.	·871	73·0	71·9	67·0	1 N W	Cum.	·928	74·5	74·3	65·4	3 N W	Clear	·879	77·5	77·0	65·6	3 N W	Clear
24	·887	64·0	60·3	55·1	1 N W	Clear	·971	72·0	70·2	60·8	2 N E	Clear	·926	74·0	73·5	62·4	2 E by S	Clear
25	·976	62·5	61·2	54·6	1 N by E	Clear	29·045	70·0	69·1	59·2	3 N E	Clear	·940	75·0	75·1	61·4	2 N E	Clear
26	·987	63·0	55·9	51·6	1 N E	Clear	·062	69·0	68·6	58·0	0 N E	Clear	29·012	73·5	74·3	60·2	1 N by E	Clear
27	29·018	59·5	55·2	50·1	1 N E	Clear	·097	69·0	68·4	54·5	2 N E	Clear	·057	72·0	71·8	56·6	2 N E	Clear
28	28·997	56·0	53·4	46·7	0 N by E	Clear	·078	65·0	63·9	50·1	1 N E	Clear	·016	71·0	71·2	53·3	2 N E	Clear
29	29·002	51·5	46·3	40·7	0 N	Clear	·075	64·0	63·8	49·2	2 N by E	Clear	·020	67·5	67·8	52·0	2 N	Clear
30 S.	28·942	51·0	47·4	42·1	0 N	Clear	·038	64·5	62·8	50·7	1 N by E	Clear	28·997	67·5	68·2	53·1	1 N by E	Clear
Means.	28·934	64·0	61·1	55·3	.....	.....	29·000	72·7	72·6	[illegible]		.....	[illegible]	[illegible]	[illegible]	[illegible]		.....

	Observations at 2h. 40m. P. M.						Observations at 4 P. M.																
	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from apparent noon to 2h. 40m. P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 2h. 40m. to 4 P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 4 P. M. to Sunset.	Aspect of Sky.	Register Thermer. Max.	Register Thermer. Min.	Max. in Sun's Ra Per Spherical Bl Bulb Regr. Ins	Rain Gauge c Ground, Registe at 6 A. M.	Phases of the Moon.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
	28·972	84·0	85·6	65·4	3 N N E	Clear	28·933	83·5	85·0	64·6	3 N N E	Clear	28·966	81·0	80·8	64·4	1 N by E	Clear	86·4	66·7	106·0	...	
S.	·950	83·0	84·3	66·4	2 E by S	Clear	·911	82·5	83·8	64·7	3 N by E	Clear	·942	80·5	80·3	65·2	1 N E	A few Dd. Cm	85·3	63·6	108·0	...	
	·901	83·0	83·8	64·7	3 N E	Lt. Cirri	·880	82·0	83·8	63·3	3 N by E	Cirri	·903	80·5	80·0	63·1	2 N by E	Lt. Cirri	84·9	63·0	105·5	...	
	·857	81·0	82·7	64·3	1 N E	Cir. Haze	·836	81·0	81·8	64·8	1 N E	Lt. Cum.	·904	79·0	78·6	65·1	1 N by E	Cum.	84·1	60·8	104·5	...	
	·890	81·5	83·7	63·0	2 N	Clear	·874	81·5	82·8	62·4	2 N by E	Clear	·915	79·0	79·4	62·2	1 N by E	Clear	84·8	61·5	105·0	...	
	·881	80·5	81·2	59·3	1 N	Clear	·848	80·0	80·2	59·1	1 N	Cirri	·893	78·5	76·8	58·7	1 N by E	Cirri	82·4	60·4	104·0	...	
	·878	76·5	77·6	58·8	2 N	Cum. Overct.	·850	76·5	76·7	58·9	1 N	Cum. Overct.	·897	77·0	72·2	58·2	0 N	Cum.	78·8	56·7	...	...	
	·838	78·5	81·4	62·2	2 N N E	Cum.	·821	79·0	80·5	62·1	2 N N E	Cirri	·874	78·5	77·4	61·5	1 N E	Cir. Cum.	82·3	57·3	101·0	...	
S.	·841	79·0	81·2	66·7	2 N E	Fair and Cum.	·828	79·5	79·8	66·9	1 S E	Overct. Cum.	·869	78·0	78·1	65·9	1 S E	Overct. Cum.	82·6	67·1	101·0	...	○Full.
	·864	78·5	78·8	71·7	1 S E	Overct. Thun.	·851	78·0	77·5	72·7	1 S	Overct. Thun.	·893	77·0	75·2	71·6	0 N E	Heavy Cum.	82·4	66·8	102·5	...	
	·892	82·0	81·8	73·1	0 N by W	Cum.	·870	81·5	80·6	72·1	0 N W	Cum.	·908	77·5	78·4	72·6	1 N	Ovt. Thr. in N.	83·5	69·6	...	·129	
	·877	82·0	83·2	73·2	2 N E	Fair and Cum.	·863	81·0	82·2	71·2	1 N by E	Cum.	·909	78·0	79·4	70·5	1 N by E	Lt. Sd. Cm.Str.	84·4	70·4	108·0	·463	
	·912	79·0	80·1	61·2	1 N E	Clear	·888	79·0	79·1	62·2	0 N E	Clear	·938	76·0	79·1	62·2	0 N E	Clear	81·2	63·7	104·5	...	
	·918	78·5	78·6	60·2	0 N E	Lt. Cirri	·909	79·0	78·7	60·5	1 N	Lt. Cirri	·954	76·0	73·9	61·8	1 N	Lt. Cirri	80·7	56·6	104·0	...	
	·917	77·5	78·6	61·1	1 N E	Clear	·902	78·0	80·1	60·2	1 N	Clear	...	...	...	...	.....	.....	81·2	55·4	102·5	...	
S.	·872	80·5	82·8	61·4	3 N by E	Clear	·853	81·0	81·3	61·2	2 N by E	Clear	·895	76·5	76·7	60·6	1 N by E	Clear	83·4	58·0	102·0	...	☾Last.
	·869	77·5	79·2	59·6	3 E by N	Clear	·856	78·5	79·3	58·8	3 N by N	Clear	·904	75·5	74·2	58·8	1 N by E	Clear	81·0	59·3	99·5	...	
	·896	75·5	76·3	56·9	3 N N E	Clear	·863	75·0	75·9	57·3	1 N by E	Clear	·909	74·5	72·3	57·0	1 N by E	Clear	77·5	52·4	99·5	...	
	·912	77·5	80·3	64·7	2 N by E	Clear	·892	79·0	80·7	64·4	1 N by E	Clear	·926	77·0	76·2	62·8	1 N, E	Clear	82·3	53·2	102·0	...	
	·892	81·0	81·1	67·3	1 N by W	Clear	·870	81·5	82·4	68·1	1 N	Cirri	·903	78·5	78·7	67·5	1 N	Cirri	83·1	60·8	105·5	...	
	·850	82·5	82·0	69·0	2 N by E	Clear	·833	84·0	84·2	69·0	1 N	Clear	·854	79·5	79·7	68·4	0 N	Clear	84·6	63·0	107·0	...	
	·808	86·0	85·4	72·9	4 N W	Cum. and Fair	·797	86·0	84·7	72·4	4 W	Fair and Cum.	·844	82·0	82·3	72·3	2 N W	Clear	86·5	65·3	102·5	...	
S.	·836	80·0	79·2	65·2	2 N W	Clear	·821	80·0	79·0	65·2	2 N W	Clear	·858	78·0	76·3	64·4	1 N W	Clear	80·4	70·0	95·5	...	●New.
	·883	77·5	76·9	63·4	1 Variabe.	Clear	·870	78·0	76·8	61·9	2 N	Clear	·911	75·5	72·6	60·3	1 N W	Clear	78·3	58·2	101·5	...	
	·918	76·5	76·8	61·9	1 N	Clear	·902	77·0	76·7	61·6	2 N	Clear	·959	73·5	72·7	60·6	1 N	Clear	77·4	60·3	99·5	...	
	·953	76·5	76·6	60·4	1 N	Clear	·935	77·0	76·5	60·9	1 N by E	Clear	·978	73·0	71·4	58·7	1 N, by E	Clear	77·8	55·2	100·0	...	
	29·024	74·5	74·8	57·5	3 N E	Lt. Cirri	·992	75·0	74·6	58·0	2 N E	Clear	29·037	73·0	69·7	55·5	1 N	Cirri	75·6	55·2	95·5	...	
	28·984	75·0	74·5	54·6	2 N E	Clear	·974	74·0	73·6	52·7	1 N E	Clear	·011	72·5	67·8	53·2	1 N	Clear	75·1	52·4	93·0	...	
	·983	72·5	72·8	53·2	2 N	Clear	·968	72·5	72·1	53·6	1 N	Clear	28·992	70·5	65·8	53·2	1 N	Clear	73·0	43·0	93·5	...	
S.	·935	70·5	70·1	53·8	1 N	Clear	·912	71·5	71·8	54·5	0 N	Clear	...	...	...	...	.....	.....	72·3	43·6	96·5	...	
ns.	28·900	78·6	79·7	63·1	.....	.....	28·880	79·0	79·4	62·8	.....	.....	28·919	77·0	75·9	62·7	.....	.....	81·1	59·6	101·7	·592	.....

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...e Meteorological Observations, December, 1851.—Lat. 22° 56′ 59″ N.—Long. 5h 18′ 34″*.—Var. 1° 43′ 28″ E.—Dip. 25° 17′.

Days of the Month.	Observations at Sunrise. Barometer uncorrected for temperature.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunset to Sunrise.	Aspect of Sky.	Maximum Pressure at 9h. 50m. Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from Sunrise to 9h. 50m.	Aspect of Sky.	Observations at Apparent Noon. Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 9h. 50m. to apparent noon.	Aspect of Sky.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°		
1	28·936	52·0	49·7	43·8	0 N N E	Clear	29·002	64·5	65·0	52·7	1 N E	Cirri	28·944	70·5	70·6	55·7	1 N	Clear
2	·902	55·0	52·7	47·0	1 N E	Clear	28·994	65·0	65·5	54·6	1 N E	Clear	·947	71·0	73·5	58·1	1 N	Clear
3	·944	55·5	55·2	49·0	1 E	Lt. Cirri	29·026	66·5	66·6	54·1	2 E	Lt. Cirri	·992	73·0	75·9	58·1	3 N E	Lt. Cirri
4	·988	56·5	56·2	48·6	1 S E	A few Cirri Cum.	·075	66·5	68·3	53·0	2 N E	Clear	29·037	71·0	73·0	55·8	2 E N E	Clear
5	29·007	58·5	56·6	49·7	0 N by E	Clear	·081	66·5	67·0	52·1	1 E	Clear	·022	70·5	72·0	55·0	2 N E	Clear
6	·032	54·0	52·1	47·1	1 E N E	Clear	·093	66·0	64·4	51·8	2 E	Clear	·048	71·5	72·7	54·3	2 E by S	Clear
7 S.	·029	56·5	52·3	46·2	1 E	Clear	·096	66·0	66·3	53·2	2 N E	Clear	·038	72·5	75·1	56·9	1 E by N	Clear
8	·003	55·0	53·7	46·0	1 E	Clear	·065	64·5	65·1	51·6	2 E N E	Clear	·015	71·0	73·6	54·7	2 N E	Clear
9	28·972	53·5	45·2	40·5	1 E S E	Clear	·062	64·5	64·7	51·3	2 E by N	Clear	·020	70·5	71·9	53·1	1 E N E	Clear
10	29·015	52·0	44·4	38·9	1 N E	Clear	·133	63·5	63·2	51·0	1 N N E	Clear	·088	68·5	70·1	52·8	1 N	Clear
11	·076	53·0	45·5	40·4	0 N E	Clear	·155	62·0	62·0	51·1	1 N by W	Clear	·107	72·0	70·5	53·9	1 N	Clear
12	·075	53·0	48·0	42·5	0 N W	Clear	·129	64·0	64·1	52·1	1 N W	Clear	·076	74·0	72·9	55·7	1 N N W	Clear
13	·063	54·0	52·1	45·1	0 N by E	Clear	·119	64·5	61·2	52·7	1 N W	Clear	·060	71·5	71·7	51·4	1 N	Clear
14 S.	·018	53·0	47·4	42·3	1 N by E	Clear	·096	64·0	63·2	52·7	1 N E	Clear	·032	69·0	69·3	55·3	1 N	Clear
15	·021	53·0	48·2	43·8	0 N by E	Clear	·063	64·0	63·5	54·4	1 N E	Clear	·009	71·5	71·6	56·5	1 N by W	Clear
16	28·980	53·5	49·2	44·6	0 N E	Clear	·032	66·0	66·8	56·2	0 N E	Clear	·001	71·5	72·9	57·7	0 N E	Clear
17	29·012	54·5	51·8	46·2	0 E	Clear	·058	64·0	64·4	54·3	0 N E	Clear	·019	73·0	73·6	55·1	2 N W	Clear
18	28·922	55·5	49·9	44·9	0 N by E	Clear	·004	64·5	63·9	54·3	1 N by E	Clear	28·992	72·5	71·8	57·7	2 N W	Clear
19	·941	57·5	50·7	45·4	1 N N E	Clear	·017	66·0	65·6	55·4	1 E by N	Clear	·976	72·5	73·1	58·8	1 N E	Clear
20	·966	57·0	52·3	46·7	0 N E	Clear	·036	66·0	65·4	55·6	1 N E	Clear	29·012	74·0	74·5	60·3	1 N E	Clear
21 S.	29·007	59·0	51·9	46·4	0 N by E	Clear	·068	67·5	68·7	58·3	1 N E	Clear	·027	73·5	73·3	60·3	1 N E	Clear
22	·014	58·0	52·1	46·8	0 N by W	Clear	·088	65·0	65·5	55·1	1 N W	Hazy Cirri	·047	76·0	74·6	58·6	2 N W	Hazy Cirri
23	·013	56·5	50·0	44·7	1 N	Cirri	·125	66·0	65·3	54·8	1 N	Cirri	·068	72·5	73·2	56·8	1 N N W	Cirri
24	·062	55·5	49·8	45·0	0 N	Clear	·124	66·0	65·9	54·8	1 N by W	Clear	·064	73·5	72·2	56·8	1 N N W	Clear
25	·013	56·0	49·3	44·4	1 E S E	Clear	·096	65·5	65·3	54·4	1 S E	Clear	·050	71·0	71·5	56·4	1 E N E	Clear
[illegible]	28·994	57·0	50·9	45·1	1 S E	Clear	·091	65·0	65·4	54·3	1 E S E	Clear	·034	72·0	74·8	57·5	2 N E	Clear
[illegible]	·952	57·0	50·2	44·7	1 E N E	Clear	·006	67·0	66·6	55·0	1 E N E	Clear	28·983	73·5	73·4	58·1	1 N W	Clear
28 S.	·938	56·5	54·1	48·1	0 E S E	Clear	·000	66·0	66·0	55·5	1 E	Clear	·971	75·0	73·1	57·9	1 N N W	Clear
29	·929	58·5	54·8	48·3	1 E	Clear	·025	66·0	66·5	55·6	1 E	Clear	·970	73·5	75·2	58·9	1 E	A few small Cum.
30	·960	58·5	57·1	50·2	1 E N E	Clear	·041	67·0	67·7	56·3	1 N N E	Clear	29·003	78·5	73·7	59·8	1 N by W	Clear
31	·975	60·0	55·0	49·4	1 N E	Cum. Str. in Hor.	·032	69·0	69·1	58·2	2 N W	Clear	28·996	75·5	75·7	60·9	3 N W	Clear
Means.	28·992	55·6	51·2	45·5	.....	.....	29·065	65·4	65·4	54·1	.....	.....	29·021	72·3	72·9	56·7	.....	.....

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	Observations at 2h. 40m. P. M.						Observations at 4 P. M.						Observations at 6 A. M.						Verandah, Per Register Instr.				
	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 2h. 40m.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 2h 40m. to 4 P. M.	Aspect of Sky.	Barometer uncorrected.	Temperature. Of the Mer.	Temperature. External. D. Bulb.	Temperature. External. W. Bulb.	Wind. Direction and force from 4 P. M. to Sunset.	Aspect of Sky.	Max.	Min.	Max. in Sun's Ray Per Spherical Bl Bulb Reg. Instr	Rain Gauge on Ground Register at 6 A. M.	Phases of the Moon.
	Inches.	°	°	°			Inches.	°	°	°			Inches.	°	°	°			°	°	°	Inches.	
	28·903	75·0	74·0	56·3	1 N	Clear	28·881	75·5	75·3	56·8	1 N	Lt. Cirri	28·915	70·5	69·7	56·3	0 N by W	Clear	75·2	45·1	101·0	...	☽ First
	·900	76·0	75·8	57·4	1 N	Clear	·876	75·5	73·4	57·1	1 N by W	Clear	·902	73·0	70·7	57·4	1 N N W	Cirri	77·7	48·7	101·0	...	
	·958	75·5	78·9	59·2	2 N E	Lt. Cirri	·927	75·0	77·8	58·8	1 N E	Lt. Cirri	·952	73·0	72·9	58·4	1 N E	Clear	79·8	51·8	·985	...	
	·982	75·5	76·3	58·7	1 N	Clear	·945	76·5	77·2	58·1	2 N	Clear	·983	73·5	72·5	57·4	1 N by E	Clear	77·7	54·2	·985	...	
	·965	75·0	75·1	57·0	1 N by E	Clear	·941	75·5	75·6	57·3	1 N	Clear	·991	72·0	71·3	56·4	1 N	Clear	76·9	52·6	·985	...	
	29·000	74·5	76·2	58·4	1 N by E	Clear	·981	75·0	76·1	59·5	1 N	Clear	29·010	73·0	70·8	58·3	1 N	Clear	77·2	47·0	·995	...	
S.	28·998	77·0	77·7	57·9	1 N	Clear	·979	77·5	78·2	57·3	1 N	Clear	28·998	74·5	72·4	56·6	0 N	Clear	78·7	50·8	101·0	...	
	·968	77·0	77·2	56·3	2 N	Clear	·942	76·0	76·3	56·5	1 N	Clear	·977	72·0	70·8	56·7	0 N	Clear	77·2	48·8	100·0	...	○ Full
	·973	74·0	72·8	54·1	1 N by W	Clear	·960	75·0	73·0	54·2	1 N	Clear	·999	70·5	68·2	53·6	0 N	Clear	75·3	45·2	100·0	...	
	29·045	72·5	72·6	54·3	1 N	Clear	29·032	73·0	70·8	53·7	1 N by W	Clear	29·058	69·0	67·4	53·4	0 N W	Clear	74·1	44·1	·975	...	
	·076	77·0	75·6	55·3	1 N	Clear	·055	76·5	74·6	55·6	1 N	Clear	...	...	...	...	1 N N W	Clear	77·0	45·7	·915	...	
	·026	78·5	77·2	57·5	2 N W	Clear	·017	78·0	76·4	58·2	1 N by W	Clear	·042	70·5	72·6	56·9	1 N	Clear	78·9	47·6	·950	...	
	·021	74·5	73·6	54·8	1 N	Clear	28·998	74·0	73·2	54·3	1 N	Clear	·030	69·5	68·7	54·7	1 N by E	Clear	75·3	47·3	·930	...	
S.	28·992	73·5	73·5	56·4	1 N	Clear	·974	73·0	74·2	56·4	1 N	Clear	·001	69·5	69·4	54·6	1 N	Clear	75·4	46·2	·970	...	
	·974	74·5	73·2	57·2	1 N N W	Clear	·958	75·0	72·3	56·6	1 N by W	Clear	28·973	70·0	68·7	54·1	1 N by W	Clear	76·5	46·8	96·5	...	☾ Last
	·954	74·5	74·3	56·8	1 N	Clear	·937	75·5	73·2	57·1	1 N	Clear	·962	71·5	69·2	54·7	1 N	Clear	77·8	47·2	101·5	...	
	·972	78·0	76·7	58·6	1 N W	Clear	·956	78·5	78·5	58·7	1 N W	Clear	·978	72·5	72·5	56·9	1 N N W	Clear	78·9	51·7	·990	...	
	·950	79·0	77·1	58·2	2 N N W	Clear	·927	78·5	76·7	58·2	1 N N W	Clear	·949	72·5	71·4	57·6	0 N by W	Clear	78·5	50·8	·975	...	
	·945	78·0	76·3	58·0	1 N	Clear	·922	78·0	76·2	57·8	1 N	Clear	·957	71·5	71·4	58·2	1 N	Clear	78·8	50·3	100·0	...	
	·971	76·5	77·9	58·6	1 N	Clear	·946	76·5	76·8	60·1	1 N by E	Clear	·985	71·0	72·2	57·9	1 N	Clear	80·0	51·5	103·0	...	
S.	·996	78·0	78·5	59·4	1 N	Clear	·975	79·0	77·8	58·6	1 N	Clear	29·015	74·5	73·1	58·1	0 N	Clear	80·0	50·6	105·5	...	
	29·004	80·0	79·1	58·9	3 N W	Hazy Cirri	·972	80·0	78·2	58·3	3 N W	Cirri	·018	74·5	73·8	56·4	2 N W	Cirri	80·1	51·4	·960	...	● New
	·033	75·0	74·9	57·7	1 N	Cir. Haze	29·020	74·0	73·2	58·2	1 N	Cir. Haze	·054	71·0	69·2	57·8	0 N	Cir. Haze	77·1	49·5	·990	...	
	·032	76·5	76·9	57·4	2 N N W	Clear	28·993	76·0	75·0	56·9	2 N N W	Clear	·031	72·0	70·4	56·5	1 N N W	Clear	77·2	50·0	·960	...	
	·017	75·5	73·8	56·8	1 N	Clear	·988	75·5	74·1	57·0	1 N	Clear,	·010	71·5	69·9	56·7	1 N N W	Clear	75·8	49·9	·975	...	
	28·992	76·0	76·3	56·3	1 N W	Clear	·963	75·5	75·2	56·7	1 N	Clear	28·977	71·5	69·5	56·0	1 N	Clear	77·4	49·7	102·5	...	
	·940	77·0	75·6	57·5	1 W	Clear	·910	77·0	74·9	57·2	1 N by W	Clear	·933	72·0	70·2	56·8	0 N W	Clear	77·0	50·4	101·5	...	
S.	·927	77·0	75·4	57·8	2 N W	Clear	·888	76·0	74·3	57·3	1 N	Clear	·910	70·5	70·2	56·7	1 N	Clear	77·3	51·3	·940	...	
	·929	75·5	75·3	59·2	2 E S E	Lt. Cum.	·904	74·5	75·2	58·7	1 S E	Lt. Cum.	·928	71·0	71·9	58·2	1 E by S	Lt. Cum.	76·8	52·4	101·5	...	
	·954	75·0	75·9	59·7	1 N	Clear	·928	76·0	76·1	59·8	1 N	A few Lt. Cm.	·954	71·5	72·2	59·7	1 N	Clear	77·2	54·1	·995	...	☽ First
	·972	78·5	77·7	60·3	3 N W	Cum.	·947	78·0	76·6	59·5	2 N W	Lt. Cum.	·978	72·5	73·4	59·2	1 W by N	Cum.	79·1	53·8	·920	...	
	28·980	76·1	75·8	57·5	.....	.....	28·956	76·1	75·3	57·4	.....	.....	28·982	71·7	70·8	56·7	.....	.....	77·4	49·5	·985	...	.....

OBSERVATIONS FOR APRIL, 1851.

1st.— } These days have been clear, with a moderate wind, and the
2nd.— } mornings and evenings have been particularly cool and
3rd.— } agreeable.

4th.—There was a haze this morning, which gradually increased till it became very dense from 11 A. M. to 5 P. M. Temperature likewise rose considerably.

5th.—Haziness of atmosphere continues. An oppressive day.

6th.— } Dullness and haziness have been the type of these three days
7th.— } combined with the appearance of a few occasional cirri. On
8th.— } the latter day distant thunder in S. W. was heard at long intervals from 2 to 4 P. M. The air feels most disagreeably dry.

9th.—Cirri have been resting on horizon all day. From this day the atmospheric conditions continued much the same till the

17th, when masses of cumuli gathered in S. W. and S. E., wind high throughout the day till near sunset, when it rapidly lulled.

18th.—Cumuli in all directions, and a slight fall in Barometeric indications. Very little and transitory sunshine. From about noon thunder was remarked in S. W. and W. chiefly, and the peals became rather loud and frequent from 1·30 to 3 P. M. The appearances of impending rain are strong, yet the hygrometer shows no signs of a similar contingency. The wind has been good through, and steadily so during the day.

19th.—A calm densely hazy morning. Barometer exhibits a rapid ascent. White cumuli traceable in the general haze. Towards afternoon the wind freshened, the haziness in some degree dispersed, and in the evening we experienced a strong breeze from N. W. Bands of cirrous haze at night.

20th.—Slight haze in morning. Cumulous clouds the entire day. At 3 P. M. distant rumbling thunder, but from which quarter proceeding it was difficult to decide. Air somewhat more humid.

21st.—Light cumuli clothed the horizon. The barometer showed considerable decrease of column, and the indications of Dry and Wet Bulbs have somewhat approximated. Starlight night, with here and there a stray cloud.

22nd.—Barometer still falling, and the hygrometer noting greater moisture. A cloudy day, the sun, however, shining brightly about midday for 20 to 30 minutes. The P. M. minimum of barometer took place at 3·30, inches 28·593, temperature 88°5.

23rd.—Mercury still on the descent, some white topped cumuli yet floating about. Minimum of barometer occurred at 3·25 P. M., inches 28·527, temperature 92°.

24th.—Barometer higher this morning. A clear day. Barometeric minimum was at 3·45, inches 28·596, temperature 90°0.

The concluding six days of the month were fine and clear, the three last mornings being remarkably cool and agreeable, the barometer continued steadily low, and unsettled.

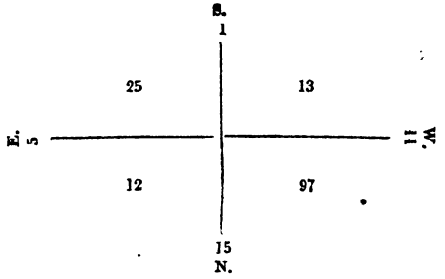
On the 28th Minimum of barometer occurred at 3·40 P. M., inches 28·628, temperature 88°.

On the 29th, do. do. 3·30, do. 28·596, do. . 87°8.

Total evaporation per Atmometer for the month, cubic inches 122·040 per square foot of surface.

Minimum tempt. per Register Thermometer (without its Reflector) exposed to the sky. April 1851.

	°
2	51·0
3	54·5
4	57·5
5	65·3
6	61·4
7	66·1
8	68·3
9	66·8
10	63·2
11	60·8
12	62·4
13	63·5
14	68·7
15	67·4
16	70·2
17	69·0
18	70·3
19	72·5
20	72·6
21	68·1
22	70·4
23	73·8
24	71·0
25	68·5
26	75·1
27	74·6
28	67·0
29	65·2
30	62·6
Means.	° 66·2



OBSERVATIONS FOR MAY, 1851.

3rd.—Heavy cum. collected, and strong wind blew the whole day from N. N. E., and abating sundown.

h.—The masses of cum. are more extensive and darker, and proceeded with great speed the North-East quarter ; wind still high during the day. Night cloudy.

h.—Much the same kind of day as yesterday ; more sunshine, however, about noon. ds rapidly form, and as rapidly disperse. A great haziness of the whole horizon. Night ormly overcast.

[illegible] tempestuous day. Haziness of atmosphere along the horizon forms

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brought out in strong relief. Sunshine and cloudiness alternate quickly. The wind is most variable, blowing in strong squally gusts. Some distant thunder in afternoon.

7th.—A more suspicious day than yesterday, but in characteristics very similar. There is every indication of a storm approaching, or of a severe storm having existed elsewhere. In afternoon much thunder in the distance. In evening a little rain fell, commencing with large stray drops.

(These notes were made upon the reports brought to me, from time to time, by a friend, and I much regret that I was too ill to attend to instrumental registrations,—and that he would not trust himself to record them.)

25th.—Cloudy suspicious day. At 3·30 P. M. dark masses of clouds collected all around. Distant thunder. 5 P. M. thunder more distinct, and lightning seen occasionally. The entire heavens dark and threatening. 6 P. M. much lightning and thunder. High variable wind changing from east point. Black banks of clouds in horizon from N. to E. 8 P. M. thunder and lightning, and threatening appearances continued. A few drops of rain. Heavy rain in E. and S. W. over the hills. 10 P. M. clearing up.

26th.—Thunder at 2 P. M. from W., clouds collecting. 4 P. M. thunder continues and the sky is more gloomy. Wind very variable, chopping round most suddenly. 6 P. M. thunder and lightning and dark clouds in S. E. 9 P. M. the thunder and lightning continue. No rain here. Sky very heavy and black.

27th.—A cloudy day. Thunder commenced in W. at 2 P. M. as yesterday. The evening became very cloudy, and some rain fell in a smart shower. The storm passed over, and the night was moderately clear.

28th.—Disposed to be a fair and warm day. But little wind throughout.

29th.— 30th.— 31st.— } Fine days, with only a few white cumuli scudding the horizon.

Total Evaporation per Atmometer, for the month, per square foot of surface, cubic inches 119·727.

Minimum Thermometer exposed to the sky, without Parabolic Reflector, May 1851.

1	65·7	Slight dew.
2	67·1	Dew.
3	63·6	No dew.
4	65·7	
5	72·8	

S
None

S. E..... 1

S. W..... 2
W. S. W. 2
4

E.

W.

N. E..... 7
E. N. E..... 1
N. by E..... 2
10

N. W..... 27
W. N. W... ... 1
N. by W... ... 7
W. by N... ... 4
39

7
N.

Total... 73

OBSERVATIONS FOR JUNE, 1850.

From 1st to the 7th.—As noticed in Register, were cloudy days. On the 1st, 2nd, 3rd, and 4th there was thunder in W. and S. W. every afternoon, commencing about 2 P. M. Nights cloudy likewise.

8th.—High wind from S. from sunrise to half past 8 A. M. of a stormy character. Dark cumuli in whole horizon. At 3·30, thunder in N. W. Clouds, white cumuli, collecting in all quarters. Atmosphere dull and overcast. Slight rain from S. E. at 4 P. M., wind N. W., but quickly veered to S. E. Rain with loud thunder from S. W. at 5 P. M.—the whole, from S. E. to S. W., along horizon dark and heavy; smart rain at 5·15 from S. W. Rain ceased at 5 40, and wind became south—some thunder still in that direction. West rather clear with a little sunshine. 8 o'clock slight rain at intervals, 9 o'clock moon shining with a slight adjoining haze. Occasional lightning in S. E.

9th.—No rain, a little thunder at 2 P. M. Dark cum. strati collecting in all quarters at 2 P. M. 8 P. M. white cumuli traversing zenith. Moon shining with a haze similar to that of yesterday.

10th.—Thunder indistinctly heard in S. and S. W. at 11·30 A. M.; sunshine. Masses of clouds banking up on horizon all round. 12·30 thunder increasing; clouds forming in larger and darker masses, especially in S. and S. W., sun frequently obscured. Strong breeze from W. S. W. 2 P. M. thunder has gradually approached with a high wind; dark clouds overhead. 2·10 some rain. 3 P. M. the storm has passed. 3·20 thunder and intensely dark clouds in North,—a sheet of heavy rain seen descending there. Wind yet W. S. W. Thunder in the N. N. E. and East, and becoming momentarily louder. 3·45 wind has changed to S. E. The entire horizon from N. W. by N. to East uniformly dark—one sheet of rain. One serpentine per-

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followed quickly by thunder. From 5·40 to 8·30, a steady gentle rain from S. W. with occasional thunder and lightning.

11th.—The morning was cloudy, and the afternoon generally fair and bright. At 11·30 some clouds crossed the zenith and obscured sunlight, and at 11·45 distant rumbling thunder was heard. At 12·30 the horizon from S. E. to S. W. by South was of a dark blue color, topped by a few white rounded cumuli. At 12·50, strong wind from S. E. with more frequent thunder. No rain followed. The afternoon was subsequently for a short period fair. At 3·30 the whole heavens were covered with clouds more or less dark colored, and in masses. 4·30 some drops of rain from N. W., the wind in that quarter. A little before sunset gentle rain descended, and continued till 8·30. Moon shone brightly at 11 o'clock.

12th.—In the afternoon clouds banked up in N. W. horizon, and at 5·30 P. M. a very violent storm of lightning, thunder and rain was progressing there. The lightning was very vivid, and the thunder was heard here about twenty seconds afterwards most distinctly. This would give the distance as $4\frac{1}{2}$ miles, at a temperature of 90° (ft. $\frac{1182 \times 20}{\text{ft. } 5280} = 4\frac{1}{2}$ nearly.) The storm did not pass away till 8·30 P. M. No fall of rain here. A very extended halo at night about the moon, which shone dimly.

13th.—Early this morning a slight shower of rain fell. The day has a monsoonish appearance.

14th.—A very cool and pleasant day. There has been a little dim sunshine. Some rain fell between 9 and 10 P. M. Night cloudy with occasional fresh breezes.

15th.—Clouds general, air cool and a little intermittent drizzling rain about 11 A. M. The barometer has been steadily high. Afternoon clear, dark clouds in W. N. W. bordering the horizon. A rapid scud passing zenith at 5·30 from West to East, whilst some masses of white cumuli are moving from E. to S. W. Cloudy night with occasional smart showers.

16th.—Generally overcast and dull.

17th, 18th, 19th and 20th.—The weather was usually fair and agreeable.

21st.—A moderately fair day. The barometer obtained its P. M. minimum at 3·45, inches 28·327, temperature 49°5. At 5·20 the sky became overcast, and wore a very stormy appearance.

22nd, 23rd, and 24th were generally fine, with an increasing temperature. On the 22nd the A. M. maximum of Barometer occurred at 9·10, inches 28·811, temperature 82·5; and on the 23rd the P. M. minimum took place at 4·20, inches 28·604, temperature 96°. On the 24th at 10 P. M. a little rain fell.

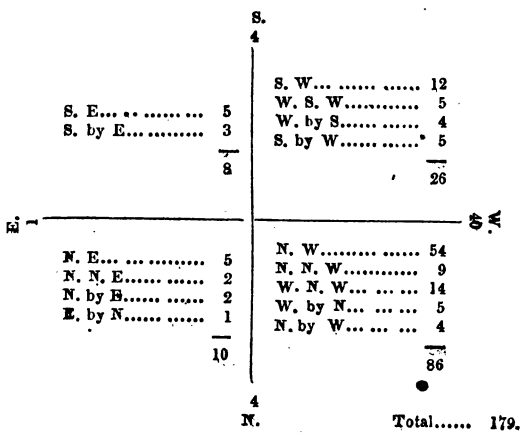
27th.—A dull day upon the whole, the sun appearing but little. At 5·50 P. M. it began to rain, and lasted till past sunset. Some thunder and lightning.

28th.—Morning dull, overcast sky. Afternoon fair and hazy. Evening overcast, a shower at 8·35, with moderate accompaniments of thunder and lightning.

29th.—The whole 24 hours overcast.

30th.—Light rain commenced at 1·15 P. M., with peals of thunder now and then, and continued with some abatements till nearly 5·30 P. M. (The rain is registered on 1st June.)

Total evaporation per Atmometer for the month, cubic inches 105·873 per square foot of surface.



Register by rain-gauge elevated 16 feet.

Date	Inches.
9	·257
11	·278
12	·044
14	·012
15	·025
16	·184
25	·073
29	·270
29	·127
	1·270
Lower	1·307
Diff.	·037

OBSERVATIONS FOR JULY, 1851.

1st.—A moderate shower of rain at 3·30 P. M. (and some thunder), which continued till 4·10 P. M. Evening and night cloudy.

2nd.—The day generally has been overcast and gloomy. Heavy rain, with thunder and lightning, commenced at 8·25 P. M., and lasted till 10·30 P. M. Much lightning in N. W.

3rd.—The morning and forenoon disposed to be fair. The afternoon was dull and overcast, and a few showers occurred. Minimum of barometer took place at 3·40 P. M., inches 28·546, temperature 85°5.

4th.—Sunshine and showers alternated during the day. Some moonlight in early part of night.

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5th.—Slight rain early this morning, some thunder in forenoon from N. W. Heavy rain in afternoon from 2·30 to 4, from S., with peals of thunder. At 6·20 heavy rain from N. with vivid lightning and loud explosions of thunder. Storm passed over to S., the rain continuing to pour down heavily. Sky uniformly overcast and dull. Rain ceased at 9·30 P. M. Cloudy night.

6th.—Cloudy in morning, fair and sunshiny at 11 A. M. A smart shower of rain suddenly from S. E., at 12·10 P. M. Fair afternoon and clear sunset. Dark masses of clouds floating about irregularly. Fine moonlight night, most of the stars visible. A vapoury halo immediately round the moon.

7th.—Fine sunshine morning, a few cumulo-strati about. The barometer was almost stationary from the 2·40 descent till about 7·20 P. M., after which it rose rapidly, being 28·743, temperature 81°0. at 10 P. M. clear moonlight and starlight night.

8th.—Much and general dew this morning, alternately clouds and sunshine. Night obscured by uniform, moderately dense cloudiness, permitting the moon only to be faintly visible. A large halo surrounded that luminary.

9th.—No dew, the sky generally covered with rounded cumuli. Less sunshine than yesterday. At 11·30 A. M. it became dark, and in the East and S. E. clouds rapidly formed, wind from that direction. 11·45 a dark sheet of rain falling there. Noon small rain commenced to descend here—wind from S. S. E., 12·10 P. M. thunder in E., rain heavier and continued with but slight intermission till 2 P. M., accompanied throughout with loud peals of thunder.

10th.—Morning now and then promising to be fine, 11·30 A. M. clouds collected in S. E. and S., and at 11·45 a smart shower of rain lasting half an hour took place; subsequently some thunder in N. E. At 2 P. M. dark ragged masses formed in S. E., and one or two loud claps of thunder were remarked. Partial sunshine here.

11th.—Fair frequently at midday, a few drops of rain from S. W. after sunset. Night cloudy.

12th.—Thunder occasionally heard in S. E. about 2 P. M. The sky was much darkened at 3·45 P. M. and quickly heavy rain commenced from that point, and continued till 4·30 attended with much thunder and lightning. The latter was distinctly visible, and some bursts of the former were very loud and immediately followed the flash. Night hazy.

13th.—Alternately clouds and sunshine about noon, and afterwards the sun appeared more steadily. Bright sunset, night obscured by hazy cirro-strati. Lightning in N. E.

14th.—Distant rumbling thunder in S. E. at 11 A. M. Suddenly at 11·35 it became cloudy and overcast in zenith, and a few minutes before noon it commenced raining heavily from S. E. lasting till 12·30. The weather then became bright and cloudy by turns, with some thunder in E. and N. E. Night cloudy, lightning in E. and S. E.

15th.—Very heavy rain this morning from 2·15 to 2·45, attended with much lightning and loud and constant thunder. At 4 the rain recommened smartly and continued till nearly 5, but no storm of lightning and thunder occurred. The morning throughout was dull and threatening, the afternoon had gleams of sunshine. The sky at night presented large masses of cumulous clouds floating about, the stars observable between them, especially to Northwards.

16th.—Thunder in S. E. at 2·30 P. M., it gradually approached, and at 3·50 the storm psased overhead, giving us a small shower. Evening very oppressive, no air stirring. Night overcast.

17th.—Thunder in S. E. at 10·30 steadily approaching, and becoming almost incessant at 11. The whole horizon from S. S. E. by East to E. is dark and stormy. Wind N. W., heavy rain at 11·10, continuing for some time. Thunder loud with scarcely any intermission. The storm passed to N. W., and the rain descended in smart showers till nearly 2 P. M. with heavy rattling bursts of thunder. Between 2 and 2·45 P. M. the sun shone for some minutes at a time. The storm returned from N. W. about 3, and the rain was experienced in downpours as before till nearly 9 o'clock, the lightning being very vivid, and succeeded quickly by the thunder.

18th.—About 1 A. M. some rain fell. At sun rise there was a great mist, and the feeling of dampness was extreme. Showery during the day, the rain coming from S. E. Distant thunder. At 6·10 a storm of lightning, thunder and rain came up from S. E. but rapidly passed over. Till 10·30 P. M. vivid lightning and constant thunder were remarked in N. W. and N., the lightning being exceedingly vivid.

19th.—Dull and misty morning, rain fell at 9, afterwards sunshine. About 11 A. M. dark clouds hung on the horizon, and the appearances generally were threatening. Subsequently till sunset clouds and sunshine alternated, the threatening indications about horizon still existing. At 7·15, the sky was uniformly overcast, and distant thunder was heard from all points. In the N. W. much vivid lightning played. This state of matters continued till 8·55, when preceded by two or three loud bursts of thunder, a deluge of rain from S. E. poured down and continued without abatement till 9·45, the lightning and thunder ceaselessly occurring. In this short time nearly 1·738 inches fell. The storm passed over to N. W., and the night was still and cloudy without further rain.

Registre by rain-gauge elevated 16 feet.

Date.	Inches.
1	·616
2	·190
3	1·482
4	·144
5	·114
6	1·524
7	·123
10	·471
11	·724
13	·542
15	2·136
17	·065
18	3·196
19	·496
20	1·617
21	·250
23	·016
24	1·442
27	·102
28	·052
29	·107
30	·504
31	·002
Total.	15·920
Lower Pluv	17·672

Difference 1.752

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20th.—A dismal, cloudy morning, at 9 a little misty rain for a few minutes. From 11·40 A. M. to nearly 2 P. M. a close light rain occurred, with a moderate breeze from S. W. and W. From 3 to 4·45 the rain was heavier and steadier from the same quarter. In the evening a strong wind from W. set in, and continued till past 10 P. M. The air felt cold and chilly, and the external thermometer ranged about 76°. Night overcast and dark.

23rd.—Heavy downpour commenced at 7·35 P. M. from S. W. and lasted till past 9. Night dark, with heavy cum.

26th.—Thunder in S. E. from 1 P. M. till 4·10, at which time a little rain fell.

27th.—Rain, lightning and thunder at 3 P. M. from S. E., at 3·45 rain from N. W.

28th.—At 2·20 P. M. thunder in S. E. Heavy rain with loud thunder from S. at 3·30.

29th.—Heavy rain at 4 P. M. from S. E., thunder and lightning.

Total evaporation per Atmometer for the month, cubic inches 31·071 per square foot of surface.

S. 11

S. E.....	24	S. W.....	13
S. S. E.....	2	W. S. W...	6
E. S. E.....	2	S. S. W....	1
E. by S.....	1	W. by S....	7
S. by E.....	4	S. by W....	2
	33		29

N. E.....	3	N. W.....	37
E. N. E....	2	W. N. W..	12
N. N. E....	1	N. N. W...	6
N. by E....	2	N. by W...	4
E. by N....	2	W. by N...	9
	10		68

3 N.

1 var.—Total 186.

OBSERVATIONS FOR AUGUST 1851.

1st.—Much lightning and thunder in S. W. & S. from 7·30 P. M. with masses of clouds passing over. At 8·10 some little rain fell. The lightning and thunder still, respectively, bright and loud, but not approaching. The day has been fair and cloudy alternately throughout.

2nd.—The morning was dull and overcast. Noon and afternoon had some transient gleams of sunshine.

3rd.—The sky was clouded till towards 4 P. M. by a succession of rapidly passing cumuli, afterwards the sun appeared but dimly. Night overcast by ragged diffused cumuli.

4th.—A dull, overcast, dismal morning. Rain commenced at 11·20 A. M. and continued till 12·15 P. M.; recommenced at 12·50 P. M., and fell steadily, but not heavily, till 6·30 (nearly without intermission in degree of steadiness) accompanied by occasional bursts of thunder about 4 P. M. At 8·20 the rain was renewed, and lasted till 6 A. M. of 5th taking on chiefly a drizzling character for the latter three hours.

5th.—At 7·10 A. M. drizzling recommenced, and ceased at 1·25 P. M. occasionally falling more heavily. A little sunshine then took place, and the wind increased in strength. Some heavy showers in afternoon and evening, and a little rain in the night.

6th.—Morning gloomy. Frequent showers. Partial sunshine in afternoon. Thunder in S. E. at 3 and 4·30. Some moonlight at night. Minimum of Barometer occurred at 3·30 P. M. inches 28·517, temperature of mercury 82°5.

Reading of Minimum Thermometers exposed to sky with and without Parabolic Reflector.				Fall of Rain by Gauge elevated 16 feet.	
Date.	Without.	In a Parabolic reflector.	Remarks.	Date.	Inches.
	°	°			°
10	69·0	68·5	Dry.	1	·401
11	68·5	68·0	Dry.	2	·032
12	68·0	63·5	Dew.	5	1·383
13	67·5	66·0	Dew.	6	·253
14	68·5	68·5	Dry.	7	·137
15	69·0	68·0	Do.	8	·908
16	70·0	68·5	Do.	9	·042
17	70·5	70·5	Rain.	10	·002
19	75·0	74·0	Bulb Wet.	11	·082
20	74·0	72·5	Wet.	17	1·209
22	72·5	70·5	Much Dew.	18	·201
23	74·0	73·5	Dew.	21	·338
24	73·5	72·5	Much Dew.	22	1·345
25	73·0	72·5	Dew on Bulbs.	25	·087
26	75·0	74·0	Do.	27	·045
27	73·0	73·0	Shower, Reflector and instruments wet.	28	·043
				29	·341
				30	·339
28	73·5	72·5		31	·002
Sums.	1214·5	1196·5	Mean Difference.	Upper Gauge Total.	7·170
Means.	71·4	70·3	1·1	Lower Gauge.	7·389
				Difference.	·219

NOTE.—The Instruments were only placed out on fair nights, or such as promised to be fair.

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Some showers from 11 A. M. to 1 P. M. Sudden bursts of sunshine subsequently, but the horizon i filled up with ragged and diffused cumuli: heavy rain with thunder and lightning from 7 to 8·45 P. M. Moon shone occasionally during the night.

8th.—A cloudy morning and forenoon, with rain, more or less drizzling, the greater part of the time. In the afternoon it was moderately clear.

9th.—A little shower occurred at 11·20 A. M.

10th.—The day was overcast with cumulous clouds till 2 P. M., and misty rain fell the greater part of the period up to that hour. Cloudy night with occasional glimpses of the moon.

From 11th to 15th (with the full moon) we had pleasant fair weather, with a steady wind of good strength: the mornings particularly agreeable, but the days increased greatly in temperature. The nights were chiefly moonlight. Min. of Bar. took place at 3·35 P. M. on the 11th, inches 28·665, temperature 81°., and at 3·30 on the 15th, inches 28·681 temperature 84°.

16th.—Morning, forenoon and noon, fair. At 1·20 P. M. masses of dark threatening clouds were observed in S. E., and shortly afterwards indistinct rumbling of thunder was heard. At 2·10 heavy rain from N. E. by North took place, and lasted for 10 minutes, afterwards the sun appeared from time to time, and the early part of night was moderately clear.

17th.—This morning at 3·30, much thunder and lightning, and smart rain (frequently descending in torrents) occurred, and lasted till 4·45. It commenced again, in a slight degree, shortly before sunrise. (This rain is entered on this date, it having fallen before 6 A. M.) The forenon and part of the afternoon till 3·35 bore indications of fair weather, at which hour cumuli rapidly overspread the heavens. A heavy shower, lasting a few minutes only, took place at 8·40 P. M.

18th.—A fair day upon the whole till the afternoon, and then the sky was covered with diffused cumulous masses. Thunder in S. E. from 1 to 3 P. M.

19th.—Thunder in S. E. from 11·15 A. M. to 2·20 P. M. when the weather became overcast. No rain. Min. of Barometer was at 3·25 P. M. inches 28·634, temperature of attached thermometer 83°5.

20th.—Slight rain from 9·30 to 10·15 A. M. Heavier rain from 2 to 3·10 P. M. The day generally dull.

21st.—Morning dull—the rest of the day till 3·30 P. M., fair and cloudy alternately. Clouds at that hour collected, and at sunset rain began to fall moderately. At 7·50 it descended in a deluge till nearly 9·30, drizzling subsequently for half an hour. Night cloudy and overcast.

22nd and 23rd were fair days mainly. Nights clear, with heavy dews. On the latter day thunder was heard in S. E. frequently.

24th.—Periodically fair and cloudy; slight rain at 12·15 P. M. continued till 1·30. Some thunder in S. E. at 4 P. M. At 7·30, rain from N. E. for a short time. Afterwards much lightning in S. W and N. W.

25th.—A clear atmosphere at sunrise,—a few light clouds resting only on horizon. Much dew on external instruments. At 7·30 clouds suddenly formed in zenith, and the rest of the day was alternately cloudy and sunshine. Thunder in S. E. at 2 P. M. Much lightning after sunset in W. S. W. Night cloudy.

26th and 27th were moderately fair days. On the former rain occurred at 11 A. M. and slightly in the night, and on the latter thunder and lightning at 3 P. M., and a shower at 3·50.

28th.—Much loud and continued thunder from 11 A. M. to 2·30 P. M. in the N. E. Heavy rain at 1 P. M. Sky was dull and overcast, with but a slight exception about noon and 2·30 P. M. throughout the day. Vivid lightning in N. W. from 7·30 to 9 P. M.

29th.—The few light clouds observable in early morning were dissipated shortly after 7, and the sky remained perfectly clear till 10·30 A. M. when cumuli rapidly formed, and at 11 loud thunder peals were heard in S. E. Light rain began to fall at 12·30 P. M. and continued off and on till the evening. At the setting in of the rain much thunder and lightning occurred.

30th.—Dull overcast day. Thunder in N. E. at 4 P. M., when a light temporary shower fell. Night cloudy.

31st.—Rain descended smartly for 10 minutes at 1·15 P. M., and recurred in a slight degree at the time of making the 2·40 P. M. observations. Min. of Barometer took place at 3·35 P. M. inches 28·438, temp. 83°·5. Rain commenced shortly before sunset, and continued by occasional falls throughout the night.—(The total rain ·501 is recorded on September 1st.)

Total evaporation, per atmometer, for the month, cubic inches 24·671, per sqr. foot of surface.

S
2

S. E.....	13	S. W.....	11
S. S. E...	1	S. by W..	2
S. by E...	2	W. by S..	2
E. by S...	4		
	20		15
N. E.....	9	N. W.....	52
N. N. E..	4	W. N. W.	11
E. N. E..	2	N. N. W..	13
E. by N..	1	W. by N.	13
		N. by W.	5
	16		94

8
N

and 2 Variable. ..... Total. 185.

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OBSERVATIONS FOR SEPTEMBER 1851.

From the 1st to 5th, inclusive, the weather was dull, cloudy and moist, and a drizzling rain prevailed nearly throught this period.

6th.—The drizzling rain which was present in the morning and forenoon merged into a smart rain at 1·45 P. M. and lasted till nearly 10 P. M. Night cloudy.

7th.—A light rain in morning, passing into a misty rain from 9 A. M. to 1 P. M. Afternoon moderately fair. Rain again in the evening.

8th.—A sh wer at 8 A. M. Drizzling rain from 9 to 11 A. M.

9th.—A little shower at 9·30 P. M. Occasional moonlight.

10th.—Morning dull and overcast. At 12·50 P. M. a dark mass of clouds was remarked in N. E. and much thunder thence. At 1·10 M. M. it began to rain here heavily, the thunder continuing. Atmosphere quite dark. 1·20, a severe storm of rain, lightning, & thunder passing over from N. E. Ceased at 2·15. A smart shower occurred at 3·20 P. M. with a loud peal or two of thunder Rain in light showers from time to time in evening, and during the night.

Readings of Minimum Thermometers exposed to the Sky with and without Parobolic Reflector.					Fall of Rain by Gauge elevated 16 feet.	
Date.	Without Reflector.	Remarks.	With Reflector.	Remarks.		
16	65·0	Bulb Wet.	62 0	B. Very wet.	1	·488
17	68·5	Dry Bulb.	65·0	B. Wet.	2	·016
18	64·0	Bulb Wet.	62 5	B. Wet.	3	·006
19	63·5	Bulb Dry.	61·0	B. Wet.	4	·104
20	65·0	Bulb Dry.	62·0	Slight dew on bulb.	5	·202
					6	·030
21	62·0	Bulb Wet.	59·5	B. Wet.	7	1·054
22	65·0	Bulb Wet.	62·5	B. Wet.	8	·096
23	67·5	Bulb Dry.	65·0	B. Wet.	9	·009
24	64·5	Bulb Wet.	61·5	B. Wet.	10	·170
25	63·5	Bulb Dry.	60·0	B. bedewed.	11	1·049
26	62·5	Bulb Dry.	59·5	B. Wet.	12	3·094
27	62·5	Bulb Dry.	59·0	Slight dew on bulb.	13	3·479
					14	·792
28	60·5	Dry Bulb.	56·0	Slight dew on bulb.	15	·041
29	59·5	Bulb Dry.	56·0	Slightly bedewed.	Total...	10·630
30	61·0	Bulb Dry.	56·5	Slightly bedewed.	On Ground	10·964
Means.	63·6	.....	60·5	.....	Difference Minus.	·334
		Difference.	3 ·1			

11th.—About 3 A. M. this morning heavy rain fell, and gradually abated shortly after sunrise. Occasional sunshine afterwards till 12·10 P. M., when peals of thunder commenced in N. E. Heavy rain took place at 1 P. M., the thunder continuing unabated. 2 P. M. the rain has ceased, but the thunder is still rolling in S. W., Wind N. W; 3·20 raining; 3·30, the sky is so much obscured as to prevent reading within the house. At 4·10 the rain commenced to descend in a deluge, with rattling thunder and vivid lightning, and continued till 4·50. Another violent storm of rain, lightning and thunder from 6·10 to 8 P. M. The rain did not entirely cease till 11·30 P. M.

12th.—A moderate shower from 1 P. M. to 2·15. At 3 P. M. a storm came up, as yesterday, from N. E., with incessant thunder and lightning, and the rain poured in torrents at 3·10. In the evening the rain, which had not wholly ceased, recommenced with vigour, and left off about 10 P. M. accompanied during the period by lightning and thunder. As yesterday, too, the storms passed over to S. W.—Glimpses of the moon from time to time in early part of night.

13th.—Light rain at intervals, without thunder, throughout the day. The sky has been covered with large ragged cumuli. The moon shone frequently during the night surrounded by an extensive halo.

14th.—Light rain forenoon and noon—the rest of the day overcast and dismal.

15th.—Although the morning was dull, a welcome change subsequently occurred, and the weather shows every indication of clearing up. The sun has appeared pretty continuously.

From 16th to end of the month, the sky was nearly uninterruptedly clear and fair. The days were warm, but the mornings and evenings particularly cool and agreeable. A gentle wind regularly blew, and the air became gradually deprived of its redundant moisture. The action of the solar rays exhibited much power.

(I will avail myself of the underneath space to transcribe the readings of four register thermometers in the sun's rays.)

Total evaporation, per atmometer, for the month, cubic inches 29·173 per square foot of surface.

S 0

		S. W.....	2
		W. S. W...	1
		W. by S....	3
			6
N. E.....	10	N. W.....	59
N. by E....	7	W. N. W..	8
E. by N....	2	N. N. W...	11
		N. by W...	6
	19	W. by N...	7
			91

E — W

20 N Total.....179

The Thermometers have projecting bulbs beyond the metal scales.				
September, 1851.	In Vacuo.	Cylindrical Black Bulb.	Spherical Black Bulb.	Cylindrical White Bulb.
15	131·5	101·0	99·5	92·0
16	128·5	103·5	101·5	95·0
18	127·5	102·5	100·0	93·5
19	132·0	104·5	102·5	94·5
20	133·5	105·5	102·5	95·0
21	135·0	107·5	105·0	97·0
22	137·0	111·0	108·5	100·0
23	139·0	114·5	111·5	104·5
24	141·0	115·5	112·5	105·0
25	144·0	122·0	118·0	108·5
26	147·5	120·0	116·0	107·5
27	141·5	119·5	115·0	107·0
28	143·0	119·5	115·5	107·5
29	144·0	118·0	114·5	106·0
30	138·5	112·5	109·5	101·5
Means.	137·5	111·8	108·8	100·9

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OBSERVATIONS FOR OCTOBER, 1851.

1st.—At 6h. 25m. 30s. (true mean time) a most brilliant Meteor passed from the eastward between the constellations Cassiopeia and Cephens, and burst at about 12° of altitude. It presented a train of great length and luminosity, with blueish and greenish tints, but the body of the Meteor shone with a dazzling white light, resembling the combustion of phosphorus in oxygen. Its apparent magnitude was quadruple that of Jupiter, and continued visible fully five seconds. It had a saltatory motion just before its dissolution, and a shower of sparks indicated the spot of disappearance. No sound was heard here.—I have on three or four occasions recently, when waiting for the transit of β Cephei remarked meteors of a small size, in all instances progressing from eastward in the direction of Draco. The light of these ærolites was uniform in color. None have been observed by me lately travelling in the opposite direction, that is from West to East.

From the 2nd to 19th the weather was unsettled; the atmospheric pressure and temparature fluctuated much (as exhibited in register) and frequent threatenings of rain occurred. On the evening of the 11th a slight shower took place, and a heavy one at noon of 12th; in the evening (8·20) of this day it began to rain smartly, but shortly afterwards the sky cleared, and the moon shone. Both these days were stormy; vivid lightning played in all directions, and thunder rolled almost without intermission till the evening of the last mentioned day. The rest of the month (from 19th) was clear and fine.

Total evaporation, per Atmometer, for the month, Cubic inches 54·838 per square foot of surface.

Readings of Minimum Thermometers exposed to the sky with and without Parabolic Reflector.					Readings of Four Projecting Bulb Thermometers in Sun's Rays.				
October, 1851.	Without Reflector.	Remarks.	With Reflector.	Remarks.	October, 1851.	Cylindrical Black Bulb in Vacuo.	Cylindrical Black Bulb exposed.	Spherical Black Bulb exposed.	Cylindrical White Bulb exposed.
1	59·0	Bulb Dry.	55·0	Bulb Wet.					
2	59·5	Do.	55·0	B. Dry.	1	138·5	112·0	110·5	102·5
3	61·5	Do.	57·0	B. Slty. bedewed.	2	141·5	117·5	113·5	107·0
4	75·0	Do.	71·0	B. Dry.	3	140·0	115·5	113·0	104·5
5	75·5	Do.	72 5	Do.	4	150·0	121·0	116·5	110·0
6	70·5	Do.	67·0	B. Slightly Wet.	5	146·5	122·5	118·5	110·5
7	68·0	Dry.	65·0	B. Wet.	6	139·5	117·5	114·0	105·0
8	71·0	Do.	67·5	B. Slightly Wet.	7	134·5	111·5	108·0	101·0
9	68·5	Do.	65·5	B. Wet.	8	132·5	106·5	104·0	97·5
10	68·0	Do.	65·5	Do.	9	133·0	106·5	103·5	96 0
11	70·0	Do.	67·5	Do.	10	137·0	114·5	111·0	104·5
12	...	Rain threatened; insts. not put out.	...		11	143·5	118·0	115·0	106·5
13	...		...		13	135·0	109·5	106·5	99·0
					14	139·0	115·5	111·5	104·0
14	57·0	B. Very Wet.	53·5	Bulb Very Wet.	15	136·0	110·0	106·5	100·5
15	54·0	Wet.	50·0	Wet.	17	128·5	108·5	104·0	97·5
16	71·5	Bulb Dry.	69·5	B. Dry.	18	139·5	114·0	110·5	103·0
17	Cloudy	Night; Instrs.	not	placed out.	19	141·0	114·0	110 5	103·5
18	64·0	Bulb Dry.	60·5	B. Wet.	20	137·5	112·5	110·0	102·5
19	69·0	Dry.	66·0	Wet.	21	138·0	110·0	106·5	100·0
20	62·5	Do.	58·0	Do.	22	136 5	113·5	108·0	99·0
21	57·5	Do.	53·0	Do.	23	131·5	108·5	105·0	98·5
22	55·0	Do.	50·0	Do.	24	135·5	108·5	105·5	98·5
23	50·5	Do.	45·5	Do.	25	131·0	104·5	102 0	96·0
24	49·0	Do.	44·0	Slightly Wet.	26	136·5	112·5	108·5	100·0
25	53·5	Do.	48·0	Do.	29	135·5	111·5	107·5	100·5
26	53·0	Do.	47·5	Do.	30	133·0	108·0	104·5	98·0
30	53·0	Do.	48·5	Dry.	31	137·0	113 0	109 0	101·5
31	54·5	Do.	49·5	Do.					
Means.	62°02		58°·08		Means.	137·2	112·4	109·0	101·7

S
1

		S. W... ...	2
		W. by S....	1
			3
S. E.....	8		
N. E... ...	57	N. W.....	15
E. N. E...	3	N. N. W...	5
N. N. E...	11	W. by N...	3
N, by E...	8	N. by W...	9
	59		32

59
N

Total.....169

Fall of Rain by Gauge elevated 16 feet.	
12	·036
13	·371
19	·004
Total.	·411

Total of R. G. on Ground ·418
Difference ·007

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OBSERVATIONS FOR NOVEMBER, 1851.

2d.—In the evening a few irregular, diffused cum. formed, occasionally interrupting moonlight.

3rd.—Light cirrous clouds commenced to collect in S. E. about 11 A. M., and generally prevailed throughout the day till 6·30 P. M. when they gradually disappeared.

4th.—Cirri were noticed till 3 P. M., when cumuli predominated.

5th.—Cloudy morning; the rest of the day clear. Night remarkably brilliant.

From the evening of the 6th to the morning of the 13th the weather was more or less cloudy, and occasionally threatening. On the 10th, about 2 P. M., thunder was heard, and the sky became overcast, and rain descended smartly for a short period at 3 P. M. The overcast condition of the heavens continued till 4·20, and a heavy shower occurred at 5·10, subsequently heavy dark cumulous masses floated rapidly towards N. W. The morning of the 11th opened with a dense fog, which was not entirely dissipated till 8·30 A. M. At 11 A. M. a brisk short shower occurred with a peal or two of thunder from a charged cloud passing over. At sunset much thunder was heard in North, and shortly afterwards rain came up from N. W., and continued to descend heavily for half an hour. The night subsequently was moderately clear, with moonlight. At 10·20 P. M. of the 12th a slight sprinkle of rain took place.

The rest of the month was almost uninterruptedly clear and fine, as will be gathered from the register.

The Mean Force of Terrestrial radiation from sunrise to sunset amounted to 4·9 for the past month.

Total Evaporation, per Atmometer, for the month, cubic inches 53·233, per square foot of surface.

Readings of Four Projecting Bulb Thermometers in Sun's rays.					Readings of Minimum Thermometers exposed to the sky with and without Parabolic reflector.				
November 1851.	Cylindrical Black Bulb Vacuo.	Cylindrical Black Bulb exposed.	Spherical Black Bulb exposed.	Cylindrical White Bulb exposed.	Nov. 1851.	Without Reflector.	Remarks.	With Reflector.	Remarks.
	°	°	°	°		°		°	
1	132·0	119·5	106·0	99·5	1	56·0	Dry.	51·0	Dry.
2	137·5	112·5	108 0	100·5	2	53·5	Do.	48·5	Blb. slightly Wet.
3	135·0	110·0	105·5	99·0	3	52·5	Do.	47·5	Do.
4	131 0	108·0	104·5	98·0	4	52·0	Do.	47·0	Do.
5	134·5	109·0	105·0	98·0	5	54·0	Do. clouds occasionally passed the zenith during the night.	49·0	Dry.
6	132·5	108·0	104·0	96·5	6	49·0	Do.	44·0	Dry.
7	...	Cloudy	Day.		7	46·5	Do.	40·5	Dry.
8	129·5	104·5	101·0	94·5	8	47·0	Do.	43·5	Do.
9	130·0	104·5	101·0	95·0	9	61·0	Do.	58·5	Do.
10	128·0	106·5	102·5	96·5	10	...	Cloudy nights, slight rain, Instr. not exposed.	...	.....
11	...	Cloudy	Day.		11	...		...	.....
12	140·0	112·5	108·0	101·5	12	...		...	.....
13	132·5	109·0	104·5	97·5	13	55·5	Bulb very Wet.	52·0	Bulb very Wet.
14	133·5	108·0	104·0	95·5	14	47·5	Do.	42·5	Do.
15	132·0	107·0	102·5	95·0	15	46·0	Bulb Wet.	41·0	Do.
16	133·0	106·5	102·0	96·0	16	49 0	Bulb Dry.	45·0	Wet.
17	129·5	103·5	99·5	93·0	17	50·5	Do.	46·0	Dry.
18	129·0	104·0	99·5	92·5	18	41·5	Do.	36·5	Slightly Wet.
19	131·5	106·0	102·0	95·5	19	44·0	Do.	39·0	Dry.
20	135·0	110·0	105·5	99·5	20	53·5	Do.	51·0	Do.
21	135·0	111·0	107·0	100·0	21	56·0	Do. (cloudy)	53·5	Do.
22	129·0	104·0	102·5	96·0	22	62 0	Do (do.)	60·0	Do.
23	123·5	98·5	95·5	90·0	23	65·0	Do. (very lt. clouds.)	62·0	Do.
24	128·0	106·0	101·5	94·0	24	47·5	B. slightly bedewed.	42·5	Bulb Wet.
25	129 0	103·5	99·5	93·0	25	50·0	Bulb Dry.	45·5	Wet.
26	127·5	104·0	100·0	92·0	26	49·5	Do.	45·5	Dry.
27	125·0	99·5	95·5	88·5	27	44·0	Do.	38·5	Slightly Wet.
28	123·0	96·0	93·0	85·0	28	39·5	Do.	34·5	Dry.
29	125·5	98·0	93·5	86 5	29	32·0	Do.	25·5	Slightly Wet.
30	129·0	101·5	96·5	88·0	30	32·5	Do.	24·5	Dry.
Means.	130·7	105·7	101·7	94·8	Means.	49·5	.....	44·9	.....

Difference.....4·6

E.			S.	W.		
	S. E...	5	1			
	E. S. E.....	4				
	S. S. E.....	1		None.		
	E. by S.....	4				
		14				
	N. E...	56				
	N. N. E... ...	12		N. W...	12	
	E. N. E.... ..	3		N. by W.....	2	
	N. by E	34		W. N. W... ...	1	
	E. by N... ...	3			15	
		108	31			

N & 2 variable.—Total... 178.

Fall of Rain per Gauge elevated 16 feet.		
11	·121	
12	·455	
	·576	
On Ground	·592	
Diff. minus	·016	

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OBSERVATIONS FOR DECEMBER, 1851.

With the very slight exceptions occurring on the 2nd, 22nd, 23rd, 30th and 31st, the month may be said to have been uninterruptedly cloudless.

The entire month has been extremely fine, bracing, and enjoyable, and to all classes most salubrious.

No trace of dew has been detected during the month.

The mean force of terrestrial radiation, from sunrise to sunset, has been 5°2.

On the evening of 23rd at 6·23·10 (L. M. S.), I noticed a remarkably fine bright meteor passing from below the northern wing of Cygnus towards β and ζ Ursa Minoris, and disappearing immediately beneath and a little beyond the first named star. It passed the dazzling brilliancy of Venus, but was smaller, and was encircled by greenish and violet rays. The train, of considerable length, was duller than met with in the generality of ærolites of large size, and I attribute this to the low altitude. The velocity was unusually slow.

This is the first meteor I have observed this season of any magnitude, progressing from West to North.

Total evaporation per Atmometer, for the month, cubic inches 48·355 per square foot of surface.

Readings of Four Projecting Bulb Thermometers in Sun's rays.					Readings of Minimum Thermometers exposed to the sky with and without Parabolic reflector.				
December, 1851.	Cylindrical Black Bulb in Vacuo.	Cylindrical Black Bulb exposed.	Spherical Black Bulb exposed.	Cylindrical White Bulb exposed.	December, 1851.	Without Reflector.	Remarks.	With Reflector.	Remarks.
	°	°	°	°		°		°	
1	132·5	105·0	101·0	92·0	1	35·5	Dry.	28·5	Dry.
2	132·5	105·5	101·0	93·0	2	40·5	Do.	34·5	Do.
3	128·0	102·0	98·5	92·5	3	43 0	Do.	37·5	Do.
4	128·5	102·5	98·5	92·0	4	45·0	Do.	39·0	Do.
5	129·0	103·0	98·5	92·0	5	44·0	Do.	38·5	Do.
6	130·5	104·0	99·5	93·0	6	37·0	Do.	23·5	Do.
7	132·5	105·5	101·0	93·5	7	43·0	Do.	36·5	Do.
8	...	104·5	100·0	93·0	8	40·5	Do.	33·0	Do.
9	...	104·5	100·0	91·0	9	35·0	Do.	28·5	Do.
10	...	102·0	97·5	88·5	10	36·0	Do.	30·5	Do.
11	...	97·0	91·5	85·5	11	36·5	Do.	31·0	Do.
12		98·5	95·0	88·0	12	37·0	Do.	32·0	Do.
13		96·5	93·0	85·5	13	36·0	Do.	30·5	Do.
14	Broken.	102·0	97·0	89·0	14	37·0	Do.	31·5	Do.
15		100·0	96·5	87·5	15	37·0	Do.	31·0	Do.
16	...	105·5	101·5	89·5	16	40·0	Do.	36·0	Do.
17	...	101·5	99·0	...	17	42·5	Do	39·5	Do.
18	...	100·0	97·5	...	18	39·5	Do.	33·5	Do.
19	...	103·0	100·0		19	40·5	Do.	36·0	Do.
20	...	106·5	103·0		20	43·5	Do.	38·5	Do.
21	...	108·5	105·5	Broken.	21	44·0	Do.	40 0	Do.
22	...	98·5	96·0		22	40·5	Do.	35·0	Do.
23	...	102·5	99·0	...	23	38·5	Do.	31·5	Do.
24	...	99·0	96·0	...	24	38·5	Do.	33·0	Do.
25	...	100·5	97·5	...	25	39·5	Do.	34·5	Do.
26	...	105·5	102·5	...	26	41·0	Do.	36·0	Do.
27	...	104·0	101·5	...	27	41·5	Do.	36·5	Do.
28	...	97·5	94·0	...	28	43·5	Do.	39·5	Do.
29	...	105·5	101·5	...	29	45·5	Do.	41·0	Do.
30	...	103·0	99·5	...	30	48·5	Do.	45·0	Do.
31	...	95·0	92·0	...	31	47·0	Do.	43·0	Do.
Means.	130·5	102·2	98·5	90·3	Means.	40·5	.....	35·1	.....

S Difference.....5 4

0

E. S. E..... 4
S. E..... 4
E. by S..... 2
—
10

None.

E 11 | 0 W

N. E.....	27	N. W.....	22
E. N. E.....	8	N. N. W...	14
N. N. E.....	4	N. by W...	14
N. by E.....	13	W. by N...	1
E. by N.....	3		—
	—		51
	55		

59

N Total.....186

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VI.—*Remarks on the Road to Shah Billawul.*

LEFT Kurrachee at 3 o'clock the evening of the 21st August 1852, arrived at Usuff ke Chukree at 5 o'clock—there are only here a few very brackish pools in the bed of the Lara Nullah. Proceeded from thence to the Banks of the Hub, about 2 koss, having made a slight detour from the road, distance from Kurrachee 9 koss, the water in the river was good, and there was no scarcity of it; procured some good Buffaloe's milk from a Pouwar hamlet consisting of 8 or 10 huts.

Started at 4 o'clock the morning of the 23rd, morning pleasant, slight drizzling rain; a very fair bridle pathway, running over a plain skirting the Mahea Hills up to Loharanie ke Suck, where we forded the river. The hills here stretch away to the north-west. Having proceeded two koss we came to a wide Nullah, called the Korara, which runs down from the Pubb Hill and empties itself into the Hubb. There are pools of fresh water at the present time, but when there is no rain they quickly dry up or turn brackish, and are not drinkable even by the men of the country. From thence to Sun Bubra is about 4 koss—the water has turned brackish,—the road here is rather stony. We were obliged to halt one koss on this side of Sun Bubra to get water, at a burial ground of the Boorahs, named Roomearoo. We afterwards found that there was good sweet water obtainable all the year round at a place called Kurra Rooee-ka-put, three koss on this side of Roomearoo, where there was a small hamlet of the Bundijahs. Water is dependant on the rain. Distance from Kurrachee 18 koss. From hence to Badh is seven koss, the first part of the road is good, but the last three miles is very difficult for beasts of burden, as the track runs up a high hill on one side, called the pass of Tubeer, and down a steep defile on the other into the bed of the Veerab, crossing which we halted at the foot of the Lakhanah hills, good water and abundance of it is procurable in the bed of the Bithe Chukree; during the hot weather this water becomes rather brackish, but is still considered drinkable by the people of the country. Left Badh for Amree on the 27th, distance 18 miles, descended the Sheroo Ghat, and having proceeded two koss arrived at the Bakra burial ground, there is water at this place which turns bad in the hot weather, except when there is a good rainy season. We crossed the bed of the Verab six times during this march—there was plenty of water in pools at each crossing. I should mention that the water from Bakra to Rohie (which is a large upright stone about seven feet high,—the word signifies a stone —which has been smoothed, and is used as a boundary mark, no one could tell what this particular one was for) was good, but becomes brackish during the hot months, but from this to Amree the pools of water are drinkable all the year round. From Bakra to Amree the road is good, two koss from this is the source of this river Verab, at the foot of the hill Kuttah. Sunday the 28th started for Shah Billawul, which we found to be six koss, the track runs [illegible] the hills

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at the foot of the Pubb range, the road is stony and bad the whole way. Three koss from Amree the road to Shah Billawul diverges from the Kelat road, inclining in a westerly direction, two low hills mark the branching of at the roads, the track to Shah Billawul gradually becomes more difficult till descending the Ghurki Ghat—a stony pass. We came into the valley of Shah Billawul, a beautiful stream named Darese Russ, issuing from a place called Marrie on the summit of the Pubb Hills, flows through this beautiful valley, between two ranges of the Pubb Hills, emptying itself into the Sumotree river, which leads into the Hubb at the Jamkee Plain, on the other side of the Kuttah Hill, twelve koss from Shah Billawul. The accounts of the beauty of this valley are by no means exaggerated, the stream meanders through beautiful Baubul trees, here and there the graceful palmy interspersed with Amree and Jamoon trees throw a grateful shade over the brook which now is seen trembling over a heap of rocks forming miniature cascades, and again rolling silently on where thick long grass overhangs the banks which are in some places covered with the state colored "fess." The surrounding hills are covered with most luxuriant shrubs and thick grass, which is watered by the heavy dew clouds which hang as a thick curtain over the hills until 10 o'clock in the day, and are then hardly dispersed by the powerful rays of the sun. There is at present good fodder for the cattle and goats all over the plains, owing to the plentiful rain which fell last month. There is a Durgah at Shah Billawul. A fair is held here during the month of Rumzan, which is attended by the followers of the Prophet in the shape of Jamote from Luss and a few of the Chootas and Bundijahs. There are two Moojawurs, one by name Sid, lives at the village called by his name, two koss from this; the other named Muzar, lives at Chuckra Kungoora, four koss to the north-west of Shah Billawul. There is not a single permanent village between Kurrachee and Shah Billawul, but there are (pohers) enclosures for cattle all over the country, and the movements of the inhabitants depend on the fodder and water, which failing them they proceed with their cattle to the banks of the Hubb.

(Signed) EDWARD P. ARTHUR,

Assistant Commr.

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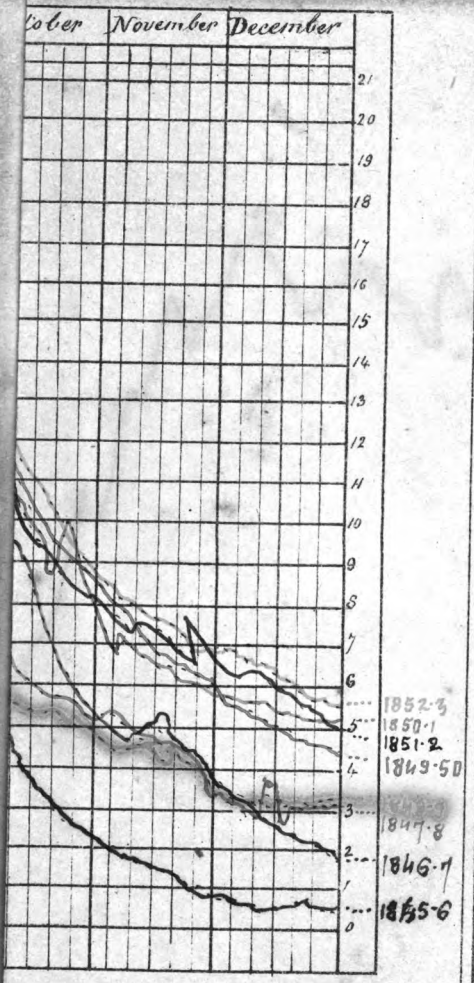

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